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For *February*, 1736.

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THE

THE PRESENT STATE OF THE Republick of Letters.

For FEBRUARY 1736.

ARTICLE VII.

I Now reſume my Account of Mr. *Chandler*'s Commentary on JOEL: I left off at the 147th Page of the Diſſertation on the third Chapter of it,† where our Author comes to conſider the Import of thoſe Gifts of the Spirit mentioned 1 *Cor.* xii. 28. the pouring out of which, (with thoſe that have been already explained) on the firſt Chriſtians, is ſuppoſed to be a Verification of that famous Prediction which is contained in the 28th and 29th Verſes of the ſecond

† That is according to Mr. *Chandler*'s Diviſion of this Book; for if we follow that of our Tranſlators, this Diſſertation is on the 28th and four following Verſes of the ſecond Chapter of it.

Chapter of this Prophecy as it ſtands in our Bibles. The firſt of theſe Gifts is,

1. TEACHERS. The Office denoted by this Word, ſeems to our Author to have been of the greateſt Dignity and Importance: It was commonly (as he ſays) aſcribed to our Lord himſelf. "He is the ſupreme and ſole authoritative *Teacher* "in the Chriſtian Church; the only proper Le- "giſlator to the Conſciences of Men. The Do- "ctrine which the Apoſtles taught, they recei- "ved from him; and therefore, under him they "were alſo *Teachers*." And what the proper Office of theſe *Teachers* conſiſted in, we may learn (as he adds) from other Words which are frequently join'd with it. Thus, 1 *Tim.* ii. 7. and 2 *Tim.* i. 11. 'tis join'd with *a Preacher:* ſo that theſe *Teachers* were Preachers of the true Chriſtian Faith. In *Rom.* ii. 20. 'tis join'd with *an Inſtructor:* their Work was properly Inſtruction. In *Eph.* iv. 11. 'tis join'd with *Shepherds: He gave ſome Paſtors and Teachers*; which Words ſeem to expreſs the ſame Office, and will lead us into the true Meaning of what the Apoſtle intends by theſe *Teachers*. "They were the pro- "per Shepherds of the Chriſtian Flock, or the "ſettled Paſtors and Teachers of particular "Churches. As Shepherds have their particu- "lar Flocks to feed, ſo theſe Teachers had their "particular Congregations to inſtruct: They "were (as Mr. *Chandler* has it) the proper *Bi- "ſhops* or *Overſeers* of the Chriſtian Church; or "*the preſiding Elders who laboured in the Word* "*and Doctrine*, 1 Tim. v. 17. For thus, as the "Paſtor and Teacher is one Officer, ſo the Pa- "ſtor, Biſhop and Elder is the ſame."

For the Proof of this tender Point, which has been ſo much and ſo fruitleſly debated, our Author brings

a few Texts of Scripture † that have been conſidered over and over again, to no manner of purpoſe; they appearing always to one Party as direct Contradictions to the oppoſite Scheme, and to the other, as every way conſiſtent with it. From the two laſt Paſſages which he quotes, he imagines, "Nothing is more evident than that "the *Elders*, or *Presbyters*, were properly *Bi-* "*ſhops*, or *Overſeers*; and that their Work, as "ſuch, was *to feed the Flock of God*, viz. by la- "bouring amongſt them *in the Word and Do-* "*ctrine*, as their ſettled Inſtructors and Teachers. "So that the Words, *Teacher*, *Inſtructor*, *Preacher*, "*Elder*, *Biſhop* or *Overſeer*, all ſignify the ſame "Officer in the Chriſtian Church, *viz.* thoſe "Perſons who preſided in the Worſhip of Chri- "ſtian Aſſemblies, and were their ſettled and or- "dinary Inſtructors in the Chriſtian Faith; and "who, in the Beginning of Chriſtianity, were "fitted for this Work by ſome extraordinary In- "fluences of the Holy Spirit upon them." Another Gift of the Spirit our Author enquires into the Meaning of, is,

2. HELPS. Mr. *Chandler* differs from *Grotius*, Dr. *Hammond*, Dr. *Whitby*, the *Miſcellanea Sacra*, and Mr. *Benſon*, in relation to the Signification of this Word. It muſt be allowed, he ſays, there is ſome Difficulty in explaining it, and room enough for the various Judgments of learned Men concerning it. He is ſorry he has found none he can perfectly agree with; he apprehends Dr. *Hammond*'s * is neareſt the Truth, and begs leave to propoſe his own Conjecture; which is,

† 1 Pet. ii. 25. Acts x. 17, 28. 1 Pet. v. 2.

* That famous Expoſitor ſuppoſed it to ſignify *the Subſidies that were given to the Poor*, out of the Church's Stock; and therefore to import ultimately the *Biſhops*, who had the Diſpoſal of them.

that it means, (as he makes out by its Etymology, and Acceptation in other Places of Scripture †) "*The Help* and Aſſiſtance that *is given* to "the *Poor* and Needy, and Defenceleſs; and "therefore theſe *Helps* mentioned by the Apoſtle "are *the Arms of the poor diſtreſſed Chriſtians*, or "ſuch who were extraordinarily raiſed up in the "primitive Church to relieve others by their "charitable Contributions, and kind and friendly "Offices towards them; and *not Biſhops* or *Dea-*"*cons*, who had only the Diſtribution of other's "Charity."

This ready Diſpoſition to do good, our Author ſays, is placed by St. *Paul* amongſt the extraordinary Gifts, *Rom.* xii. 8. which leaves little room to doubt who theſe *Helps* were, that we are now enquiring into. Beſides, as he farther adds, the *Septuagint* renders the *Hebrew* Words for *one that extends Mercy*, Pſal. cix. 12. and likewiſe thoſe which ſpeak of God as a *Shield*, a *Refuge*, a *Place of Defence*, and a *Rock*, by the ſame *Greek* Word that the Apoſtle expreſſes this Gift by. This may ſerve, as he ſays, for the Explication of it; and poſſibly may lead us to a right underſtanding of the next, which is,

3. GOVERNMENTS. Mr. *Chandler*, after reciting the Sentiments of others which he cannot agree with, tells us, "Theſe Governments "were probably the Perſons who had the Care "of the publick Stock in the Chriſtian Aſſem-"blies, and who gave out of it in ſuch Propor-"tions as they judged proper for the Relief of "the Poor; or, in other Words, the *Deacons*." After an Argument to confirm this Opinion, that may poſſibly have ſome Force in it, he concludes this

† Luke i. 54. Acts xx. 35. Pſal. lxxxiii. 8. xxii. 20. Eccleſ. x. 12.

this long Article (as he calls it) by adding a few Words concerning the Office of another extraordinary Character, *viz.*

4. The EVANGELIST. We have but two Perſons (as he ſays) in the whole New Teſtament, who are expreſly called by this Title: and they are *Philip* and *Timothy*. * From what is recorded of the one, and from the Directions given to the other, we may, he thinks, learn what the particular Nature of their Office was. By what is related of *Philip*, Acts viii. 5—38. it appears, "His Office conſiſted *in preaching the Goſpel*, con- "firming the Truth of it by *ſpecial Miracles*, and "*baptizing* ſuch as were converted; not in any "particular Place, but whereſoever the Spirit of "God was pleaſed to direct and order him." And thus it agrees partly with the apoſtolick Office, but differed from it in this: "That the Evange- "liſts could not confer the Gifts of the Holy "Ghoſt upon others, as the Apoſtles did; nor "had thoſe peculiar Powers which they had." For after *Philip* had preached the Goſpel to the *Samaritans*, the Apoſtles ſent two of their Number, *Peter* and *John*, from *Jeruſalem*; who, when they had prayed for and laid their Hands on them, communicated to them the Holy Ghoſt.

Concerning *Timothy*, whom St. *Paul* commands to *do the Work of an Evangeliſt*, we alſo read, that he——† was to *give attendance to Reading, Exhortation, and Doctrine, to preach the Word, to be inſtant in ſeaſon and out of ſeaſon, to reprove,*

 rebuke

* Acts xxi. 8. 2 Tim. iv. 5.

† The Words which intervene here in the Diſſertation it ſelf, not in the leaſt, as I thought, illuſtrating the Senſe of our Author upon this Head, but rather the contrary, I choſe entirely to neglect them: But if the Reader can make any thing of them, they are in the ſecond Paragraph of the 152d Page of the Original.

rebuke and exhort, with all long-ſuffering and doctrine. —— Beſides this, he was *to commit* what he had heard of this Apoſtle whom he attended, *to other faithful Men, who ſhould be able to teach others*, i. e. to appoint Paſtors and Teachers, Biſhops and Overſeers in the Churches, with great Care and Caution; for he was to *lay Hands ſuddenly on no Man.* And from hence, our Author thinks it appears very plain, "That the Office of "an Evangeliſt was ſuperior to that of Elders, "Biſhops and Paſtors; eſpecially as *Timothy* was "authorized by St. *Paul* to rebuke them, and "judge of the Accuſations that were brought "againſt them, 1 *Tim.* v. 19."

But then it is certain, as he adds, that it was inferior to that of Prophet or Apoſtle; ſeeing theſe received the Knowledge of the Goſpel by immediate Revelation from Chriſt, and were qualified to be Teachers in the Church, by the ſpecial Influence of the Holy Ghoſt; whereas the *Evangeliſts* received their Goſpel and Inſtructions from the Apoſtles, and were confined to their Directions; ſee 2 *Tim.* i. 13. iii. 10, 14. ſo that they were properly "*Attendants* on the A-"poſtles, Followers of them in their Labours "and Patience, Companions with them in their "Travels, inſtructed by them in the Knowledge "of the Goſpel, and choſen to preach their Go-"ſpel, to execute their Orders, ſettle the Churches "they planted, and ſometimes to prepare the way "for them, by preaching the Goſpel to thoſe "who before had been Strangers to the Doctrines "of it."

Our Author having thus given ſome Account of thoſe extraordinary Gifts of the Spirit of God, which were poured out on many of the firſt Chriſtians; by which it appears, that the Effuſion of the

the Spirit was much larger, both as to the Gifts conferred, and the Perſons to whom they were granted, than ever was vouchſafed under the Old Teſtament Diſpenſation; and that this Prophecy of *Joel* was literally accompliſhed in a moſt ſurprizing Manner by this wonderful Event, concludes all he has to ſay upon this Subject, by two or three Remarks upon the whole.

1*ſt*, There can be no reaſonable Ground, as he thinks, to diſpute whether theſe Gifts were in Reality vouchſafed or not: ſince "If St. *Paul* "was a Man of common Senſe and Prudence, "he could never have wrote in the manner he "did to the Churches he planted, unleſs he had "in Reality convey'd to them the Gifts of which "he ſpeaks in his ſeveral Letters. For as he ap"pealed to the Conſciences of thoſe he wrote to "concerning them, ſuch Appeals muſt have been "the higheſt Inſolence and Folly. Theſe mira"culous Gifts were very extraordinary things, as "to which Men could never be deceived, whe"ther they had them or no. If they had known "they had them not, what muſt they think of "*Paul*, when in his Letters he ſpeaks of them "as frequent and common amongſt them? Would "not ſuch an Appeal to them for the Truth of a "notorious Falſhood have ſpoiled all his Credit "for Inſpiration, and expoſed his Goſpel to Con"tempt? eſpecially as he put his own Credit, "and the Credit of Chriſtianity too upon the "Certainty of them." But, as Mr. *Chandler* rightly obſerves, there is nothing in any Part of this Apoſtle's Conduct and Writings, that can lead any one to think him ſo weak or wicked a Man. "The Strain of all his Epiſtles evident"ly ſhews the full Certainty of his own Perſua"ſion in this Matter. He ſpeaks of theſe Gifts

" as common in the Churches, and as one that " abundantly knew he could not be contradicted " in relation to them, and had a Witneſs in the " Conſcience of every Man to whom his Epiſtles " ſhould be read." And as theſe Gifts were thus conferred, they were an abundant Proof of the divine Influence on their Minds, and of the Truth of that Religion for the Confirmation of which they were granted.

2*dly*, Our Author remarks further, the Wiſdom of this Diſtribution of ſpiritual Gifts, and the Suitableneſs of them to the State of the primitive Church. " It ſeems probable, the firſt " Converts to Chriſtianity were generally Peo- " ple of the loweſt Ranks and Stations in Life, " 1 *Cor.* i. 26—29. —The lower Part of Man- " kind, who wanted external Advantages of " Learning and Power, and were deſpiſed on that " account, were beſt diſpoſed to embrace the " Religion of Chriſt. But how was it poſſible " that Chriſtianity could be ſupported amongſt " them, or the Chriſtian Worſhip carried on? " The Apoſtles who converted them were obli- " ged at times to leave them, and could not al- " ways ſtay with them to form and ſettle their " Aſſemblies, inſtruct them fully in Religion, " and defend them againſt Seduction. And " therefore to prevent their forſaking the Reli- " gion they had embraced, God furniſhed many " of them with theſe extraordinary Gifts; raiſing " up amongſt themſelves, to ſubſerve the apoſto- " lick Commiſſion, and ſupply the Abſence of " the Apoſtles, *Prophets*, *Evangeliſts*, *Paſtors*, " *Teachers*, with all the reſt of thoſe Abilities " and Qalifications, which have now been inſiſt- " ed on." To this he adds,

3*dly*, That the conferring of theſe Gifts was an Argument of the divine Authority of the Chriſtian Religion; and that the *Gentiles*, who had them, as well as the *Jews*, were become the Church and People of God. This is what St. *Paul* inculcates in many Places; as 1 *Cor.* ii. 4, 5. 1 *Theſſ.* i. 5. ii. 13. "The Gifts of the Spirit were ſuch "as no human Power could convey, nor any "human Wiſdom or Art could poſſibly imitate; "and therefore demonſtrated the Religion that "convey'd them, to be from God; and that all "Perſons on whom they were conferr'd, were "accepted of God as the Members of his King-"dom and Church."

The *Jews* had for many Ages been the peculiar People of God, and imagined that the Bleſſings of the Meſſiah's Kingdom were to be confined to them only. But as God had determined to introduce the *Gentiles* into his Church, and to adopt them equally as his Children, with the others, in Chriſt; ſo he gave them alſo the Spirit in theſe extraordinary Gifts of it, as the Evidence of their Adoption, and to ſhew that he put no Difference between *Jews* and *Gentiles*, if their Hearts were purified by Faith.

Mr. *Chandler*, after illuſtrating this Particular by ſome *Texts* out of the New Teſtament, in his uſual Way, tells us, that hence alſo we may learn to explain that difficult Paſſage in the 10th of the *Hebrews*, at the 29th Verſe, *He that deſpiſed Moſes's Law died without Mercy*, &c. Accordingly he has favoured us with a long Explication thereof, which thoſe Readers will do well to peruſe, who have ever found any Difficulty in it. Having diſpatched this Task, it now only remains, he ſays,

In

In the ſecond place to ſhew the exact Accompliſhment of this Prophecy in the latter Part of it, *Joel* ii. 30, 31, 32. And here Providence it ſelf (he ſays) hath kindly tranſmitted to us the Facts, by which the full and exact Accompliſhment of theſe things appears.

" From the Beginning of the *Jewiſh* War, " which happened in the twelfth Year of the " Reign of *Nero*, the *Jews* were expos'd to the " moſt grievous Calamities. *Florus* the *Roman* " Governor ſlew of them in one Day three thou- " ſand and ſix hundred. At *Cæſarea*, above " twenty thouſand of them were maſſacred by the " Inhabitants. The *Syrians* ſlaughtered as many. " The Inhabitants of *Scythopolis*, thirteen thou- " ſand. Thoſe of *Aſcalon*, two thouſand five " hundred. Thoſe of *Ptolemais*, two thouſand. " And many other Cities very large Numbers of " them; particularly *Alexandria:* in which there " were ſlain of them fifty thouſand. *Ceſtius* the " *Roman* Governor took *Zabulon*, a beautiful " City, and burnt it; and afterwards *Joppa*, " where eight thouſand four hundred *Jews* were " put to the Sword. At *Damaſcus* ten thouſand " of them were cut off. When *Veſpaſian* came " into *Judea*, he took *Gadara*, and burnt it, " with all the neighbouring Cities and Villages. " In the ſame manner he ſerved *Jotapata*, where " the *Jews* were all put to the Sword. *Joppa* " and many other Places underwent the ſame " Fate. Theſe and many others were the *Signs* " *and Wonders of Blood and Fire, and Pillars of* " *Smoke*, that preceded *this great and terrible Day* " *of the Lord*; the utter Deſtruction of the *Jew-* " *iſh* City, Temple, and Nation; which was " accompliſhed by the *Romans* under *Titus*, and " which is an Event ſo well and generally known,

" as

" as to need no farther Account or Deſcription " of it.

" Of this Day of the Lord our bleſſed Savi- " our gave the fulleſt Warning, commanding his " Diſciples to flee and make their Eſcape, when " they ſhould ſee *the Signs of his coming*, and *the* " *End of the* Jewiſh *World.* This Warning they " unqueſtionably took; it being evident, that " notwithſtanding the Slaughter of infinite Mul- " titudes of the *Jews*, the Cauſe of Chriſtianity " did not ſuffer, nor the Multitude of Chriſti- " ans grow leſs. They were not involv'd in the " Miſeries of this unhappy Nation, nor had any " Perſecutions excited againſt them under *Veſpa-* " *ſian* or *Titus*, who were the Inſtruments of " Providence in bringing Judgments upon the " *Jews* to the uttermoſt. The very Perſecutions " that were raiſed againſt the Apoſtles and Chri- " ſtians at *Jeruſalem*, were the Occaſion of the " Diſperſion of many of them into the moſt di- " ſtant Nations. And at laſt, as *Euſebius* informs " us, the whole Church at *Jeruſalem*, by a di- " vine Warning that was given to ſome holy " Men, before the War departed from that Ci- " ty, and the whole Country of *Judea*; and thus " eſcaped the common Calamity and Deſtructi- " on. *So that in* Jeruſalem *there was Deliverance*, " *the Apoſtles and Chriſtian Converts having made* " *their Eſcape from it*,† and in the Remnant of " Chriſtians whom God had called, amongſt any " other Nations whatſoever."

The Prediction therefore, ſays our Author, and the Accompliſhment, anſwering ſo exactly to each

† It is not I think by any uſual Figure of Speech, that the Chriſtian Converts deſerting *Jeruſalem* before the Siege, and thereby eſcaping the Calamities of it, can be ſtiled Deliverance in that City, or be a Completion of that Part of the Prophecy which our Author refers it to.

each other in every Circumſtance, are a noble Confirmation of the Truth of Chriſtianity, and ſhould be improved by all to their *continuing ſtedfaſt and immovcable, and always abounding in the Work of the Lord.*

ARTICLE VIII.

A DISSERTATION *on the Origin of Springs.*

THE Account I have already given of the third Volume of *Spectacle de la Nature* is ſufficient to inform the Publick of the Method and Subject of it; and the Extracts I then laid before them, will juſtify my Recommendation of it in the preceding Number, where I ſpoke of the ſecond in Terms leſs favourable. But to enforce what I have ſaid yet farther, I ſhall now preſent them, as I then promiſed, with our Author's Dialogue upon FOUNTAINS, only changing the Form of it into that of an uninterrupted Diſſertation; in the following manner:

There is no Effect in Nature either more viſible or ornamental than the inexhauſtible Flux of Fountains, and the Courſe of Rivers, which continue for whole Ages to flow along in floating State, and fill their ſpacious Beds with never-failing Plenty. On the other hand, there is no Effect whoſe Cauſe Nature ſeems more induſtriouſly to have kept concealed from us. What Source is ſufficient to feed ſuch a River as the *Rhone?* What Store-houſes large enough to ſupply

ply the mighty Ciſterns of the *Danube*, the *Ganges*, or the River of the *Amazons?* Where are thoſe eternal, immenſe, inviſible Reſervoirs, which through ſo many hidden Channels pour forth ſuch inexhauſtible Treaſures of Water, filling the vaſt Boſoms of the Rivers with a Profuſion abundantly ſufficient for all our Wants, and yet reſtrained within ſuch proper Bounds as not to overflow, inſtead of enriching the Countries they paſs thro'.

The ſupreme Being, in thus diſcovering to us the Courſe, and concealing from us the Source of Rivers, ſeems to have made them an Emblem of his own Nature, which, in like manner, is always fruitful and beneficent, though at the ſame time inviſible to us. The Liberality of our great Creator, like them, is perpetual, magnificent, inexhauſtible, without Oſtentation, and without Reſerve; it ſhowers down Bleſſings upon the moſt undeſerving; and as it is never weary with giving, ſo neither does it upbraid us with its Gifts; its Benefits are univerſal and conſpicuous to all, whilſt the Hand that diſtributes them is hidden from our Eyes.

It might ſeem as if God by thus concealing the Origin of Fountains, had, in effect, forbid our Enquiry into it. But we are not to ſuppoſe that he prohibits our Inſpection into every thing that he has caſt a Veil over, nor are all his Ways unſearchable, becauſe not obvious; on the contrary, he has implanted in us a natural Deſire of attaining to a more compleat Knowledge of thoſe things, which we have at firſt but a very imperfect Acquaintance with; and as we are apt to wonder at thoſe Works of God, whoſe Cauſes and firſt Principles we are ignorant of, ſo do we find another Kind of Admiration raiſed in our Minds,

Minds, in proportion as we grow acquainted with the Formation, Workmanſhip, and Beauty of them. We may then endeavour to penetrate into the hidden Cauſe of Rivers; for 'tis certain, that whatever new Diſcoveries we are able to make in a Phænomenon we are ſo converſant with, and in which we daily diſcern the Footſteps of our Creator's moſt amazing Liberality, cannot fail to heighten our grateful Adoration of him.

When we look for the Origin of the *Seine*, the *Garonne*, or the *Rhine*, or when we trace the ſmalleſt, as well as the largeſt Rivers to their Sources, we never find them riſing in the middle of Plains, but all iſſuing out from the Bottom or Middle of Mountains. Now what particular Privilege or Property belongs to them, that they ſhould thus be made the only Magazines of ſuch vaſt Collections of Waters? It is true, that by their Elevation above the Plains, they are advantageouſly ſituated for ſupplying Rivers with their proper Contingents of Water; but how came they by their Stores? for we ſee no Reſervoirs on the Tops of them ſufficient to ſupport ſuch a perpetual Conſumption. If we look into the Bowels of the Earth, if we deſcend to the Sea, which is the great Source of this Circulation of Waters, and ſay, the Fountains ſupply the Rivers, the Rivers diſcharge themſelves into the Sea, and the Sea, which would otherwiſe be overcharged, again reſtores to the Mountains the Tribute it receives from the Rivers, in order to feed the Springs; this will admit of no Doubt: But conſidering there is a vaſt Diſtance betwixt the Sea and ſome Mountains, it will be yet very difficult to account for the Conveyance of the Water ſo long a Journey.

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There are but three Hypotheſes of any tolerable Repute, relating to this Queſtion, whereof to chuſe; none of the reſt are worth mentioning, much leſs the Trouble of confuting.

The firſt is that of Mr. *Deſcartes*, who was of Opinion, that the Water of the Sea diffuſed itſelf in all Directions under Ground, and that coming to the Bottoms of Mountains, it there met with large Caverns, into which, being rarified by the central Heat beneath, it aſcended in Vapours, leaving its Salts behind, as being ſpecifically heavier; that theſe Vapours being impeded in their Aſcent by the Tops of the Caverns, there condenſed, forming little Streams or Currents of Water, like the Steam in the Head of an Alembick.

The ſecond Hypotheſis lays down, that the Sea-water percolates through the Pores of the Earth, which though large enough for the finer Parts of the Fluid to permeate, are yet ſo ſmall as to deny Admittance to the ſaline Particles that are commix'd with them, which the Water in the Courſe of its Filtration leaves behind: thus refining and purifying itſelf it becomes freſh and potable before it mixes with the Fountains and Rivers.

Thoſe that are Advocates for the third Hypotheſis maintain, that the Sea has no Communication with the Mountains by any ſubterraneous Channels, but only above the Earth; that there perpetually ariſes a Vapour from the Surface of Rivers, Lakes, and the Sea, that is carried thro' the Atmoſphere in the Form of a Cloud or a Miſt by the Impulſe of Winds; and that according as it meets with a colder Air, or is ſtopped in its Progreſs by Mountains, it condenſes and falls down in Dew, Snow, or Rain; that the Water

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in which ſoever of theſe Shapes it deſcends, does afterwards find ſeveral Chinks and Crannies, thro' which it inſinuates itſelf into the main Body of the Hills or Mountains, where it is lodg'd in Beds of Stone or Clay, according to the Nature of the Soil, where by degrees increaſing its Store and Strength, it forces its Way through the firſt Outlet it meets with, and takes the Name of a temporary or perennial Fountain, according to the Capacity of the Baſon within that ſupplies its Current.

Father *Rapin*, in a beautiful Poem, wherein he has very elegantly handled this Subject, ſeems to ſet light by the Opinion of thoſe who would ſolve this Phænomenon by the Condenſation of rarified Vapours in the vaulted Caverns of Hills; nor does he make any greater Account of that other Hypotheſis which aſcribes it to Rain; but favours the Philoſophy of thoſe who attribute the Riſe of Springs to the Sea-Water, filtrated thro' the Pores of the Earth.

But he is probably miſtaken in his Judgment. The firſt Opinion he undertakes to deſtroy may be defended two Ways: Firſt, by laying down, that the external Air being replete with Vapours, does, upon their Condenſation, diſcharge them into the Reſervoirs of the Mountains; which exactly tallies with the Philoſophy of thoſe who aſcribe the Origin of Fountains to Rain and Vapours, which ſhall be examined hereafter: Or, ſecondly, it may fall in with the Opinion of Mr. *Deſcartes*, and ſuppoſe that the Water of the Sea finds a free Paſſage under the Earth to the Bottoms of Mountains, into which it aſcends in Miſts, where it is condenſed into large Drops by the Sides of the Rocks; but this is not ſtrictly agreeable to Truth; for in the firſt place, it is begging the

the Queſtion to ſuppoſe any ſuch free Paſſages of Communication betwixt the Sea and the Feet of Mountains, nor can any Experiment be produced to warrant the Suppoſition of theſe ſubterraneous Channels; on the contrary, where-ever running Waters have been diſcovered under Ground, it has been obſerved that they run from the Mountains to the Sea, and not contrarywiſe.

But granting that the Water has as free a Paſſage as they can deſire, and ſteers its Courſe without any Interruption to the Place of Rendezvous, what will follow? Why then it is pretended that they, meeting there with a ſufficient Degree of Heat to rarify them, aſcend in Vapours into the vaulted Caverns of the Rocks, where they are condenſed by the Cold, and trickle down the Sides in great Drops, as in the Head of a Still; that then finding a Paſſage through the Sides of the Hills, they iſſue forth into the open Air under the Name of Springs, and deſcend upon the Plains. But this is to order things juſt as they would have them, and not as they are in themſelves: For allowing, as we ſaid before, the Waters a free Paſſage from the Sea two or three hundred Leagues in Length under the Ground to the Roots of high Mountains; yet where are the Furnaces which remain in ſuch a conſtant State of Readineſs and Heat to rarify theſe Waters, and make them evaporate in Clouds? Allowing ſtill farther that there is a ſufficient Degree of Heat for this Purpoſe, yet where are thoſe Caverns ſix or ſeven hundred Paces high, whoſe cool Vaults are to condenſe theſe exhaled Vapours? It is certain that People have digged and penetrated far enough into the Bowels of the Earth and Mountains to make the Diſcovery, without having ever found Caverns big enough to allow the Vapours

a free Aſcent to the Height of the Fountains from which the Rivers take their Source. So that theſe marvellous Alembicks are nothing more than mere Fancies.

There is ſtill another Reaſon for rejecting this Hypotheſis, which is this; that tho' we ſhould allow ſuch an Aſſemblage of Waters under the Mountains, a ſufficient Heat to rarify them into Vapours, and Caverns high enough for them to aſcend up to the Middle of the higheſt Mountains; yet all theſe Conceſſions would avail nothing, nor the Concurrence of all theſe Cauſes produce the leaſt Stream of freſh Water; ſince the Vapours adhering to the Sides of the Caverns, and there condenſing, not finding any Receptacle to lodge in, whence they might iſſue out through the Sides in Springs, muſt neceſſarily fall down again into the Baſon from which they aroſe.

To all this may be added two other Proofs which are Matters of Fact, that will thoroughly convince every one of the Abſurdity of ſuppoſing thoſe Alembicks with which M. *Deſcartes* ſeems ſo highly delighted: The one ſhall be taken from what paſſes on the Outſide of the Earth, the other from what is obſerved within it.

After a long Ceſſation of Rain, whether in Summer or in Winter, it is found by Experience that the greateſt Part of the Springs fail, ſeveral Rivers are drained almoſt quite dry, and the largeſt of them have ſcarce Water enough to cover the Bottom of their Channels. Now what have the Vapours, which aſcend from the ſubterraneous Waters, to do with its raining or not raining, ſeeing they muſt operate independently of any ſuch Cauſe? The Water is in the Alembick, the Cover upon it, and the Furnace always burning; why then does not the Buſineſs of diſtilling go on?

on? For if this be the Caſe of Fountains, as the Cauſe always remains the ſame, the ſame Effect muſt always continue to be produced; nor would any external Drought any ways affect it, which is quite contrary to Experience. Let us, in the next place, proceed to conſider what paſſes within the Earth; and here neither do we find any thing that gives the leaſt Colour of Probability to ſuch pretended Evaporations exhaling from the Bottoms of Mountains to the Tops of them, and there forming great Reſervoirs of Water to feed the Springs that iſſue through their Sides. We hear of People that have viſited vaſt Numbers of Grotto's and Caves of all Dimenſions, ſome of which were perfectly dry, and conſequently without having Communication with the Waters that come from the Sea; others have been found all cruſted over by Time, with a congealed, cryſtalized Fluid; ſome having little Currents of Water paſſing through them; and others diſtilling from their vaulted Roofs Drops of Water which ſettle at the Bottom. Now it is agreed by the beſt Judges, that thoſe fluid Globules that ſweat thro' the Pores of the Caves, and there petrify or cryſtalize, proceed ſolely from Rain-Water, which ſoaking through the Crannies of the Earth and Caves aſſociate with ſandy or ſaline Particles, and ſo form themſelves into ſpiral or conick Figures; in which Metamorphoſis the Sea viſibly has no manner of Share. As for thoſe little Streams of Water that run through ſome Caves, they are moſt certainly produced by the Rains which penetrate through the Earth, ſeeing they are obſerved to diminiſh or dry up in Proportion to the Severity or Continuance of the Droughts. And laſtly, it is plain that that Humidity which diſtils through the Sides of certain Grotto's can in

no wiſe be aſcribed to the Sea-Water, foraſmuch as there is none of it found in the Bottom of thoſe Grotto's; and becauſe it is obſerved, that their Dampneſs increaſes in Proportion to the Quantity of Rain that deſcends into them; whereas by a long Diſcontinuance of wet Weather they become entirely dry.

The Opinion which ſeems to be Father *Rapin*'s favourite one is, that the Water of Fountains does not paſs through any ſuch Alembicks as we have been ſpeaking of, but perhaps may be conveyed to them directly from the Sea, having left its Salts on the Sides of thoſe ſubterraneous Channels it paſſes through, purging and clearing itſelf of all heterogeneous Mixtures, by draining thro' the Rocks and Sands which it viſits in its Paſſage, like Water in a ſandy Ciſtern.

This Notion is, it muſt be owned, ſpecious and plauſible enough; but let us try if, upon Examination, it will prove ſatisfactory. In the firſt place, it cannot be imagined what becomes of the Salt which ſo many Rivers muſt have depoſited under Ground. It is now about ſix thouſand Years that the Sea, according to this Hypotheſis, has been diſtributing out its Waters and Salts to the Sources of Rivers, without having received in Return from them any other than freſh Water; and conſequently it would have happened, by degrees, either that the Sea muſt have emptied itſelf of all its Salts, or the Earth have been ſo overcharged with them, as that theſe Salts would have block'd up thoſe ſubterraneous Channels it ſhould paſs through, in order to ſupply the Fountains; juſt as we ſee the Waters of *Rougis* and *Arcueil*, in leſs than fifty Years, ſtop up their own Paſſage by incruſtating the Inſides of the Pipes they paſs through with Sand and Salt

Salt that is intermix'd with them. But we will endeavour to ſet this Argument in a clearer Light.

The Water of the Rivers, according to this Hypotheſis, comes directly to the Fountains from the Sea, through the Pores of the Earth, after having firſt, by Filtration, depoſited all, or nearly all, the Salts which it before contained. Let us now compute what Quantity of Salt the Water of one of our Rivers in *France* may leave under the Earth in a certain determinate Time, and we ſhall find that that of the *Sein* alone, in one Day's Time, does leave † behind it, under Ground, more Salt than is made in our Salt Pits for the Proviſion of the Kingdom of *France* for a whole Year. * But if to the Rivers of *France* we add thoſe of the whole Earth, theſe Maſſes of Salt will in time become bigger than the Mountains, and the Earth muſt every Year increaſe and ſwell with theſe additional Supplies of Matter. And what a ſenſible Augmentation would already have been made to it, theſe Rivers having now been five or ſix thouſand Years continually running, if this Suppoſition were not entirely groundleſs.

But let us try if we cannot make this Opinion of Filtration carry ſome Air of Probability, by granting that this Secretion of the Salt from the Water is not performed within the Earth but by the Sands at the Bottom of the Sea; and this Conjecture is ſtrengthned by ſeveral Fountains of

† I rather think it ſhould be, *would* leave, *i. e.* on Suppoſition of the Truth of this *Hypotheſis*, which the Author is here examining, in order to confute. Whereas our Tranſlation expreſſes it ſo as to imply the Truth of it.

* This Aſſertion, that may be apt at firſt View to ſtartle the unskilful Reader, is very clearly demonſtrated, in this place, from a few reaſonable Poſtulata; which Demonſtration I may omit without any Prejudice to the Subject.

freſh Water that we often obſerve to ſpring out at very ſmall Diſtances from the Sea; which ſeems to prove that the Work of Filtration is perform'd immediately before the Water enters into the Earth, and that the Salts remain ſtill at the Bottom of the Sea.

But with all the Allowance of this Kind that we can make, this Hypotheſis is not tenable; for even theſe neighbouring Springs do moſt of them dry up in great Scarcity of Rain, which is an Evidence they take their Riſe from an Aſſemblage of Rain-Water within the Earth, and not from the Sea, which, notwithſtanding any Droughts, is always equally in a Condition to feed them. Beſides, if the freſh Waters that are often found in the ſmalleſt Iſlands, and even bordering upon the Sea, proceeded from it by Filtration, it would be a very eaſy matter to ſecrete the Salt from the Sea Water, and to cure it of its Brackiſhneſs, which would prove of infinite Service in Navigation; whereas we are convinced, by an almoſt infinite Number of Experiments, of the little Succeſs we are to expect from any Attempts of this Kind, even after ſtraining it through a hundred different Sorts of Sand and Veſſels. All the Art that we can uſe with it will only ſerve to qualify the Degree of its Saltneſs, not to take it away; for ſpight of the moſt skilful and accurate Preparations, it will ſtill retain a brackiſh and bituminous Taſte, that renders not only it, but alſo every thing that is dreſſed in it intolerably nauſeous. It lacerates the Inteſtines of thoſe that uſe it, and diſcolours their Urine with the Blood of thoſe little Veſſels which were ſcratched and torn with the ſharp-pointed Salts that are in it.

To all this it may be objected, that our Ignorance of filtrating Sea Water as it ſhould be, is

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no Argument againſt the Superiority of the Knowledge and Power of God: And that it is very natural to think the Sea Water leaves its Salts on the Sands beneath, by draining through them; and then percolating through the Pores of the Earth, is raiſed by degrees to the Top of it by ſome certain Power of Attraction; as it appears plainly, that both Sand and other terreſtrial Matter has a Power of attracting Water, by ſome very familiar Experiments; ſuch as that of a Lump of Sugar put into a little Coffee, which is immediately ſeen to aſcend through the Pores up to the Top of it; as likewiſe of Water poured upon the Ground at the Bottom of a Heap of Sand, which will preſently riſe half way up it.

This is indeed the moſt plauſible Objection that can be ſtarted. As for the firſt part of it relating to God, it will ſhortly appear, there is no manner of Occaſion for any particular Reply to it, when the Method which Providence has appointed for effecting this Phænomenon comes to be deſcribed: In the mean time, with reſpect to the reſt, it may be anſwered, that neither the Sands nor the Earth have that attractive Quality which the Objection ſuppoſes in them; for the Cauſe of Water's riſing in them is the external Preſſure of the Air, that forces it up into porous Bodies in which the groſſer Parts of the Air cannot act with free Power. But this Elevation of Water is only to a certain Height; for it has been found by frequent Experiments made by immerging the End of a Tube, filled with Sand or Earth well dried, in Water, that the Water riſes in ſome Sands to the Height of eighteen, in others to the Height of thirty-two Feet, tho' it generally falls ſhort of this, and it's probable it has never been known to riſe higher. Now what

Proportion is there betwixt the Aſcent of Water, occaſioned by the Weight of the Air, to the Height of thirty-two Feet, and its aſcending half way up a Mountain a thouſand Fathoms high above the Plain. Beſides, the Water of the Sea blocks up its own Paſſage through the Sand and the Earth, by a ſort of glutinous Subſtance that covers the Bottom of it, and by a vaſt Quantity of precipitated Salts that ſhut up the Interſtices of the Sands inſtead of keeping them open.

But allowing that the Water, paſſing through the Sands, does afterwards inſinuate itſelf into the Pores of the Earth, yet it would be impoſſible for it to make any conſiderable Progreſs; for immediately after Filtration we ſhould ſee it ſpringing up in the Plains, eſpecially thoſe that are adjacent to the Sea, before it could reach the Mountains, which is contrary to Matter of Fact. How comes the Water to ſeem ſo averſe to the Plains, and ſo fond of the Mountains? Or if it delights to take a Journey of two or three hundred Leagues to make them a Viſit, how will it be able to aſcend five or ſix hundred Fathoms into the Mountains, when it could not riſe before to a very inconſiderable Height above its Level to water the Plains? But granting that a very high Tide is able to make the Water aſcend into the Boſoms of very high Mountains, what Force, ſhall we ſay, hinders it from riſing more than half way up, what Power keeps it from aſcending ſtill higher, and gaining the Summit? For this it was never known to do. Beſides, if the Water, whether by the Preſſure of the Air, or the Attraction of the Earth, could thus every-where inſinuate itſelf through the ſubterraneous Veins and Channels of it, the Earth would ſoon be ſoaked thro', the Sea would forſake its Bed, and mix with the

Plains

Plains and the Mountains; and in ſhort, the whole Globe would, in a little time, become like a Spunge.

Indeed thoſe who are fond of this Hypotheſis, are ready to ſay, when they are preſs'd with theſe Queſtions, that however difficult it may be to account for the Water's paſſing ſo regularly thro' the Pores of the Earth, without ſpringing up at the ſame time in the Plains, or aſcending to the Tops of the Mountains; yet it is nothing leſs than Matter of Fact, that Sea Water is found in ſome Places above a hundred Leagues diſtant from the Sea. There are at *Salins* in *Franche-Comte* inexhauſtible Wells of Salt Water; and whence can that come but from the Sea? In the Mines of *Wiliſca* in *Poland* they have been digging Salt above four hundred Years; now what but the Sea can ſupply theſe Mines with freſh Recruits of Salt, and repair ſuch a vaſt Conſumption of it?

But notwithſtanding all this, we ſhall be able to demonſtrate that the Sea has no manner of Communication, either with Salt Wells or Salt Mines. There would, 'tis true, be ſome Colour for ſuppoſing it had, if the Places the Salt was dug out of became repleniſhed afterwards with new Supplies: But that, there is not the leaſt Ground for aſſerting, as appears from hence, that thoſe Cavities which have been once dug remain always to have free Paſſage out of one into another; and the Miners are obliged, at certain Times, to prop up the oldeſt Mines with freſh Supporters for fear of Accidents. Nay, ſo far is it from being true, that any Salt Water comes from the Sea to ſupply theſe Mines, that, on the contrary, we are aſſured by thoſe who are well acquainted with them, that there is in them a Rivulet of freſh Water, which beyond all doubt does proceed

ceed from the Rains, foraſmuch as it decreaſes or quite dries up, according as the Droughts are in Duration or Degree; and after having paſſed thro' the Mines, it loſes itſelf under Ground, and runs into the Sea beneath the Surface of its Waters. The long Continuance of theſe Stores of Salt, which furniſhes a Pretence for fancying they are recruited by the Sea, proves only the vaſt abundance of the firſt Stock, which conſiſts of Veins or Layers of Salt, that have exiſted in theſe and ſeveral other Places, either ſince the Creation of the World, or at leaſt ſince the Time of the Deluge, when the Earth and Sea were mixed and blended together into one common Menſtruum.

As for the ſalt Water that they draw from the Wells of *Salins*, it is, in ſhort, nothing elſe than Rain Water, after having paſſed through ſome Veins or Mines of Salt that are to be found in ſeveral Places within the Earth, which being by little and little waſh'd away and diluted by theſe Waters, is carried by them into the Wells. And as to the Objection, that if this were the Caſe, theſe Mines of Salt muſt in time have been quite exhauſted, or at leaſt very much impair'd; and the Water by continually waſting them in this manner, ought to hollow itſelf a Bed beneath the Bottom of the Well. We find it really to be ſo, and at this very Day they are obliged to dig much deeper than they did formerly, in order to come at the ſalt Water.

The falſe Hypotheſes which ſome have eſpouſed for ſolving this Phænomenon being thus overthrown, we may proceed to inveſtigate the true Method of Nature in this great Operation, that is of ſuch Conſequence to the Subſiſtance both of the animal and vegetable Creation: and in order thereunto, there are two Propoſitions that muſt be demonſtrated; one is, *That*

That the Vapours which ariſe from the Sea are much more than ſufficient to ſupply both the Surface of the Earth and the Rivers with Waters: The other,

That the Mountains do by their particular Structure and Formation attract, and, as it were, arreſt the Vapours and the Rain that fluctuate about the Atmoſphere, and having collected them in their Reſervoirs within, diſmiſs them again through their Sides either in perpetual or intermitting Currents. †

For proving the firſt Propoſition it muſt be obſerv'd, that by a very accurate Eſtimate which has been made of the Rain that might fall upon the Earth in one Year, it has been computed at a Medium to amount to the Height of about twenty Inches. Thoſe who are unacquainted with Enquiries of this Nature would be apt to conclude immediately from hence, that it is impoſſible the Rivers can be ſupply'd only by Rain; but it ſhall evidently be ſhewn, that a Quantity far leſs than is known to fall annually will be ſufficient for that Purpoſe.

A cubick Foot of Water is nearly equal to thirty-five *Paris* Pints; now after knowing this, it is an eaſy matter to compute how many cubick Feet, and how many Pints are contain'd in one ſquare

† If I had intended this Diſſertation merely for the Inſtruction or Entertainment of the Reader, I ſhould not have proceeded in what follows according to our Author's Method; or rather I ſhould have dropt his whole Proof of the firſt Propoſition, and ſubſtituted in the room of it, the Experiments and Calculations of Dr. *Edmund Halley* relating to this Subject, which are in all Reſpects much preferable to it: But as I deſigned it likewiſe to be a Specimen of the Work, ſo I ſhall punctually adhere to the Order I find there; altering nothing this Writer advances, any otherwiſe than by omiting ſuch Particulars as are altogether ſuperfluous in the Form it appears under, and adding a few Words, as I have done all along, neceſſary for changing the Dialogue into a continued Diſcourſe.

Square * Toiſe of Water twenty Inches in Depth, and then divide it into Hogſheads. Theſe things being premiſed, let us found a Calculation upon one of the Rivers of *France*, for Inſtance the *Seine*, by which we may judge of all the Rivers of the Globe, what Proportion the Waters of them bear to the Quantity of Rain that falls yearly upon the Earth.

Upon caſting up the Rain that would fall upon an Extent of Ground 60 Leagues long and 50 broad, from the Source of the *Seine* to within ſome few Leagues of *Paris*, including thoſe Lands which are watered by the Rivers *Armenſon*, *Jonne*, *Loin*, *Aube*, *Marne*, and ſome others that ſend their tributary Supplies into the *Seine*'s Boſom, we find that the Sum total of all the Rains that would fall in one Year upon that Extent of Land would amount to 71415000000000 cubick Feet.

After having computed the Quantity of Rain that is to ſupply the *Seine* with Water, our next Buſineſs is to meaſure the Water of the *Seine* it ſelf, in order to come at the Exceſs of the one above the other, and for this Purpoſe we will make choice of the *Pont Royal*, through which, at every given time, a certain Quantity of this Rain-Water muſt paſs, to find out how much Water runs under the Arches of this Bridge in a Minute. The Breadth of the *Seine* before the *Louvre* is four hundred Feet, the mean Depth of it five Feet: Now four hundred multiplied by five give two thouſand. To find out how far theſe two thouſand Feet of Water travel in a Minute, we need only caſt a Stick into the River; and then making an Eſtimate of the Velocity of the Water by the progreſſive Motion of the Stick that floats

* A Meaſure containing ſix Feet.

floats down with it, we ſee that the Water when high, and the Current ſtrong, travels from the Arches over two hundred and fifty Feet of Ground in one Minute: But as it moves ſlower near the Middle than at the Surface, and much ſlower ſtill at the Bottom, where its Motion is retarded by the Friction of the Earth; and whereas, when the Water is very low it travels very little more than a hundred Feet in a Minute, even at the Surface, and conſequently not ſo far near the Bottom; we may therefore ſuppoſe its mean Velocity to be no more than one hundred Feet in a Minute; it will follow then, that the two thouſand cubick Feet of Water, which are at any given time under the Arches of the *Pont Royal*, will in one Minute's time have paſſed beyond it one hundred Feet, being ſucceeded by as many times two thouſand Feet of Water as they have travelled over Feet of Ground in that time.

Now that being one hundred Feet, there will have paſſed through the Bridge in one Minute's Time a hundred times two thouſand Cubick Feet of Water. If then we multiply two hundred thouſand Cubick Feet of Water by ſixty, the Number of Minutes in an Hour, the Product will be twelve Millions, which being again multiplied by four and twenty, the Number of Hours in a natural Day, will give two hundred eighty eight Millions of cubick Feet. Compare then the Sum total of the Rain-Waters that fall upon all the Lands adjacent to the *Seine* above *Paris*, taking the height of them but at fifteen Inches, with the Sum of the Waters that flow thro' the *Pont Royal* in one Year, and it will be found that the Quantity of the former is ſix times greater than that of the latter, there being 7141500000000 cubick Feet of Rain-Water, and only

105120000000 cubick Feet of the *Seine* Water. So that if we ſhould allow the Water of the *Seine* to be twice as much as we have eſtimated it at, or it really is, the Rain alone will furniſh double that Quantity, altho' we ſhould ſubſtract from it a fourth part of what it certainly amounts to, reckoning the Depth of it at fifteen Inches inſtead of twenty.

Some may be at a loſs to conceive, if there falls ſuch an Exceſs of Water upon the Earth beyond what all the Rivers of it are able to diſcharge, what becomes of the Remainder. For the Information of ſuch it may be obſerved, that the Over-plus, which is very conſiderable, ſerves for the Drink of Animals, and for the Refreſhment and Nouriſhment of Plants. The whole Earth is covered with Plants, that in the Day-time ſuck in through their Roots the Water that is diffuſed under Ground, and ſip by Night through their Leaves the Moiſture of the circumambient Air. The Expence of Water that is neceſſary for the Support of the whole vegetable Creation may be judg'd of by the Quantity that is required for that of a ſingle Plant. Mr. *De la Hire* put two Fig Leaves into a Phial fill'd with Water, and he obſerved that in leſs than ſix Hours they ſucked in the ſixty fourth part of the Water, at this rate therefore they would have drunk up the whole in ſixteen Days.

Theſe Conſiderations will give full Satisfaction to thoſe who have been uſed to wonder, that the Sea which is continually drinking up the Rivers and Brooks that run into it, does not overflow its Bounds and deluge the Plains; when they underſtand, that the Vapours which it ſends to water the Earth, are more in Quantity than what is repaid it by the Rivers: Perhaps, on the con-

trary, their Fear will now be, leſt the Sea, if it goes on to give more than it receives again, be exhauſted in time, and become quite dry: But this Apprehenſion alſo will be removed, and the matter adjuſted on both Sides by the following Obſervations. In the firſt Place let us ſuppoſe that the Surface of the Sea is nearly as great as that of the inhabited Land; and let us ſee in the next Place, whether the Number of Inches of Water that aſcend from the Surface of the Sea in Vapours be more or leſs in Quantity than the eighteen or twenty Inches of Rain that yearly deſcend upon the Earth.

If a Pan full of Water be ſet in the open Air in very hot Weather, eſpecially if there flows a ſmart Breeze of Wind, it will loſe one Inch in twenty four Hours; at other times not more than half an Inch; or if the Weather be very cold, the Quantity evaporated will be much leſs, and perhaps not diſcernible. It is very natural to ſuppoſe then, that from all the Seas that lie between the Tropicks, there riſes at leaſt half an Inch of Water, every Day, and probably more: But as the Seas towards the Poles may not loſe by Evaporation the ſixth part of that, we may ſet the greater againſt the leſſer, and then may ſafely venture to fix the Quantity of Water evaporated from all the Seas in a Day at one fourth part of an Inch; the Column of Water therefore that riſes from the Seas in one Year will be ninety Inches. Of the twenty Inches of Water that, as we have before ſeen, are detach'd of to ſupply the Occaſions of our Lands, we have already ſeen, that not above ten of them are conveyed back again to the Sea by the Channels of the Rivers; the other ten, after having contributed to the Nouriſhment of Animals and Plants, returns to

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the Ocean, partly through ſubterraneous Paſſages, and partly are carried away by Evaporation, to join the common Maſs of Vapours, which we ſuppoſe ſtill to conſiſt of eighty Inches at the leaſt, in Depth. We muſt conſider, that as great a Quantity of Rain falls upon the Sea as upon the Land, and therefore muſt deduct twenty Inches from the Sum total of Vapours upon this Account, which will then ſtill conſiſt of ſixty Inches. Now how ſhall we diſpoſe of this prodigious Quantity of Water that remains, or how be able to reimburſe the Sea ſo vaſt an Expence? But the Difficulty would be ſtill greater beyond all Compariſon, if, beſides the Loſs of ſuch a vaſt Body of Water by Evaporation, it was farther obliged to ſtock the Fountains and Rivers through the ſubterraneous Canals; nay, at this rate it would ſoon be quite exhauſted and dry'd up.

The Truth is, the two remaining thirds are kept in Reſerve for the Wants of the Torrid-Zone; the Inhabitants of which would infallibly be ſcorch'd by the perpendicular Beams of the Sun, if Providence had not provided a large Veil or Covering, which ſeaſonably interpoſes it ſelf betwixt them to ſhield them from the exceſſive Heat; inſomuch that that Seaſon of the Year when one would be apt to apprehend their being deſtroy'd by this flaming Luminary almoſt inevitable, is in reality their Winter, and the coldeſt Seaſon of their Year.

At the time of the Sun's Aproximation to the Tropick of *Cancer*, when he advances towards the *Septentrional* Climates, the northern Winds take the Signal, and begin to drive before them the vaſt Collection of Vapours, which being hurl'd into the Torrid Zone, are immediately con-

condenſed by the boiſterous Winds, and ruſhing againſt the *Abyſſinian* Mountains, and thoſe which they find in *India*, and other Places, are daſh'd aſunder, and deſcend in Torrents of Rain for ſeveral Months together, which pouring down the Sides of the Mountains into the Plains, at laſt meet in the capacious Channels of thoſe great Rivers that run acroſs the Countries; hence the River *Indus*, the *Ganges*, the *Niger*, and the *Nile*, derive their mighty Stores and ſwelling Tides, overflowing the Countries they paſs through with Seas of Water, whilſt thoſe Places that are ſituated lower than theſe rainy Regions, ſometimes have not a drop of Rain for whole Years together.—— In like manner, when the Sun has paſs'd over to the other ſide of the Equator, there are other Winds that blow *à propos* from the ſouthern Parts of the Earth to the Equator, to the Relief and Refreſhment of the Inhabitants of *Guinea*, *Monomotapa*, *Congo*, *Brazil*, *Peru*, and of thoſe that live about the middle of *America*, bringing in their Stores of Water, which pour down in Torrents into that vaſt Multitude of huge Reſervoirs which are to ſupply the Rivers *Zaire*, *Oronoko*, of the *Amazons*, and *La Plata*. Theſe are the chief Rivers that by diſemboguing their large Magazines of Water into the Sea, repair the Loſs it had before ſuſtain'd by Evaporation. But if it ſhould yet be doubted whether thoſe continued Cataracts of Rain that deſcend upon the Countries lying under the Torrid Zone be ſufficient to remit to the Sea a Quantity of Water equal to a Body of the ſame Fluid, ſixty Inches deep, extended over the whole Surface of that Part of the Globe, it is to be conſidered that the Rains ſhower down in no leſs Abundance upon thoſe Parts of the Sea that lie perpendicularly

under the Sun, than upon the Countries that have the ſame Situation; and therefore it is no Paradox to aſſert, that ſixty or eighty Inches of Rain-Water, perhaps much more, fall yearly into the Sea under the Torrid Zone; nor is this at all to be wonder'd at, when even in *Italy* at *Piza*, and in ſeveral Parts of *England*, the whole amount of Rain in one Year riſes to forty or forty three Inches. Now allowing ſixty Inches of extraordinary Rains to fall again into the Sea under the Torrid Zone, beſides the thirty Inches common to the Torrid and the two temperate Zones, the Sea upon the Balance of the Account, will be found to have loſt nothing by Evaporation. And this may ſerve for proving the firſt Propoſition we were to demonſtrate, in order to determine the true Origin of Fountains, *viz.*

That the Vapours which ariſe from the Sea are more than ſufficient to ſupply both the Surface of the Earth, and the Rivers with Water.

We may now proceed to the Confirmation of the ſecond, which is,

That the Mountains do by their particular Structure and Formation attract, and as it were arreſt, the Vapours and the Rain that fluctuate about in the Atmoſphere, and having collected them in their Reſervoirs within, diſmiſs them again through their ſides, either in perpetual or intermitting Currents.

If we inſpect ſuch Parts of the Mountains as are laid bare by the deſcending Torrents which flow down the Sides of them, we may diſcern the ſundry Sorts of Matter whereof the Inſides of 'em are compoſed. Near the Top, under the Coat of Earth that produces a few Thorns and Brambles, we ſee a Bed of coarſe gravelly Sand, under which we may perceive another Bed of grey Sand, which is again ſupported by one of Stone,

Stone, beneath which we diſcover ſeveral others ſucceeding in order down the Steep towards the Horizon. On the other Side of this Hollow, a great Number of like Strata or Layers may be perceived, lying one above another almoſt horizontally towards the Top, then bending down and turning up in the Form of a Bow, with its Extremities pointing upwards. It will be needleſs at preſent to give a particular Account of the various Sorts of Matter that compoſe theſe Strata; it is ſufficient here at once to obſerve, that every Part of the Globe, whether we dig into the Mountains or Plains, conſiſts of nothing elſe than broad Teguments or Strata of Earth laid one above another.

The Tops of Mountains abound with Inequalities, Cavities, open Reſervoirs, ſubterraneous Grotto's, and gaping, and if I may call them ſo, disjointed Cells. Their pointed Summits that dart up into the Air arreſt the Vapours that fluctuate in the Atmoſphere, which being conſtipated thereby, deſcend upon them in the different Forms of Snow, Dew, or Rain; their Cavities receive and contain the melted Snows and Rains, which then precipitate through ten thouſand different Crannies to the Bottom; by Reaſon of their Gravity, they eaſily penetrate through Beds of Sand and lighter Earth, till they are ſtopp'd in their Deſcent by more denſe Strata, as Layers of Clay or Stone, where they make their Lodging; then they work a Paſſage horizontally, or elſe are forced by their own Gravity through the Sand, till they arrive at the Extremity of the Stratum of Stone or other denſe Matter which obſtructed their perpendicular Deſcent, and iſſue out at the Side of the Mountain into the open Air. Now according as the Body of Sand it

drains through is more or leſs deep, or the hard Stratum underneath more or leſs hollowed Baſon-wiſe, to contain a larger or ſmaller Quantity of Water, ſo the Fountain that proceeds from it is either intermitting or perpetual.

The Water that iſſues from theſe Reſervoirs does not, for the moſt part, ſpring out with Violence; but ſtraining gradually through thoſe vaſt Receptacles of Sand which God has planted in the Bowels of Mountains, and in which it is collected, it ſucceſſively trickles down in the moſt eaſy and gentle manner. By this uſeful Mechaniſm of the Mountains, that overquick Diſcharge of the Water is prevented, which would infallibly exhauſt the whole Store before it could be recruited by the Return of the Rain, and conſequently deprive the neighbouring Inhabitants of thoſe conſtant Supplies of Water which they ſtand in need of.

Hence we may obſerve, that what we oftentimes regard as uſeleſs, nay ſometimes as detrimental to us, is really that which moſt contributes to our Uſe and Benefit. The Sea notwithſtanding all its Salts, is that firſt original Fountain which ſerves to quench our Thirſt. The Winds, whoſe rough Blaſts we ſo much complain of, brings us our Vapours from the Sea: The high Tops of the Mountains, which we are apt to look upon as adminiſtring to no Purpoſe of Advantage, ſerve to fix and condenſe them. The Holes, Caverns and Crannies, that make the Earth in many Places look ſo deform'd and frightful, ſerve inſtead of ſo many Pipes and Strainers for the Waters to paſs through into the Bowels of the Earth: And thoſe Strata of denſe, conſolidated Matter ſerve them for a Baſis and Foundation. But there is nothing in which more

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Wiſdom and Contrivance appears, than in thoſe Maſſes of Sand juſt ſpoken of, which have been plac'd on purpoſe in the midſt of thoſe Reſervoirs, to prevent too great a Profuſion of Water at one Time, and to diſpenſe it to us with ſo diſcreet Oeconomy. This exquiſite Order and Diſpoſition of the Parts of Mountains is not a mere Imagination or Hypotheſis like the Doctrine of Filtration and ſubterraneous Alembicks, but is the Subject of ocular Demonſtration *.

But let us ſtill take a farther Survey of the Mountains and Plains, and we ſhall find by a few curſory Obſervations on the different Effects that are produced by the Vapours that deſcend upon them, ſo viſible a Relation between the Courſe of theſe Vapours and the reſpective Circumſtances and Conditions of Fountains, that it will undeniably appear the former are the Cauſe and Origin of the latter. The Mountains that are within the Torrid Zone receive ſuch a prodigious Abundance of Rain at that Time of the Year when the Sun is perpendicular to them, that the Quantity of Water which is collected in them is ſufficient to raiſe the Rivers they nouriſh to the Height, ſometimes, of fourteen or fifteen Cubits.

At that Time of Year when the Snow that covers the Mountains begins to melt, they break out in Springs that continue to flow only till the

* Immediately after this Paragraph, our Author, to illuſtrate and eſtabliſh his Theory, enters into a particular Deſcription of ſome of the Fountains near *Zurich*, which afford ſeveral Phænomena that are favourable to it: He expatiates on all the Circumſtances of them that any way conduce to his Purpoſe, and accounts for the Appearances of them upon his Hppotheſis, which he farther enforces by a Recital of two or three Facts that ſeem entirely to confirm it. But as I think theſe Inſtances, tho' well enough in the Dialogue, are leſs ſuitable to a general Diſſertation, I have choſen to omit them, without any Prejudice, I believe, to the main Subject.

Snow ceaſes to diſſolve, and conſequently thoſe Rivers that are fed by them muſt be full in Summer, and fail in Winter; and this is frequently obſerved in *Lombardy*, at the Foot of the *Alps* and *Appennines*.

If theſe Mountains are only covered with Snow in the Winter, the Fountains and Rivers that iſſue from them ſwell in Times of Thaw, or in the Spring, and often dry up in the Summer.

Where the Mountains are only watered with Rain, and not covered with Snow, as is the Caſe commonly with the Mountains of *France*, there, as the Rains are generally moſt violent as well as moſt frequent towards the latter End of the Summer, and in Autumn, they ſend forth Rivulets or Rivers that are higheſt in Autumn and Winter, and loweſt in the Spring and Summer. In thoſe Places where they have no Mountains, the Snow and the Rains are loſt in the Earth and in the Rivers, which being increas'd by theſe additional Supplies of Water, depoſite part of their Store, as they run along deep enough in the Earth to form Wells and little Fountains, which again contribute in their Turn to the Maintenance of their proper River, but grow lower or dry up when it fails to receive its uſual Augmentation. As for thoſe Waters that ſoak through the Plains, they feed thoſe Wells that the Inhabitants dig in the Earth to different Depths. The Occaſion of the Inequality of their Depths is the Situation of thoſe Layers of hard Clay that the Waters reſt upon, according to their farther or nearer Diſtance from the Surface of the Plains.

It will be ſaid, it may be, that if this were indeed the Caſe, we ſhould always find Springs at the Feet of Mountains, and never want the Convenience of a Well in the Plains; whereas nothing

thing is more certain than that there are Mountains that produce no Springs, and Plains that yield no Wells. To this it may be anſwered,

That when the Tops of Hills are covered with Stone, Chalk or Clay, we are not to expect to meet with any Springs; for the Rain not being able to make its way through theſe hard Strata, runs down the Sides and loſes itſelf in the Plains or the adjacent River. So when the Plains are compoſed of an over porous Earth, or where there are Fiſſures and Crannies in the harder Layers of Matter, the Water does there deſcend ſo extremely low as to leave no Poſſibility of procuring the Benefit of Wells. Such for Example is the Country of *Caux*, where there is not ſo much as one Mountain fit to produce a Spring, nor any Layer of Earth under the Plains cloſe enough to retain the Water that ſinks into them; at leaſt, if there be any ſuch, it is ſo very deep that there is no coming at it.

At this rate, may not ſome be apt to ſuſpect there is as much Water under the Earth as there is upon it? For the Rains that fall upon the Plains muſt there aſſociate into a vaſt Body; and as there are not always *Strata* of hard Earth in the Mountains fit to retain and ſtay the Waters that ſoak into them, they muſt conſequently deſcend lower down to form great Beds or Reſervoirs, which, by reaſon of their not evaporating like thoſe in the open Air muſt ſtill increaſe, and ſo in time riſe above the Surface of the Earth, and cauſe a total Inundation.

At the ſame time that we obviate this Apprehenſion, and ſhew how the Waters that ſink into the Bowels of the Earth are really diſpos'd of, we ſhall furniſh ourſelves with an additional Proof of what has been ſaid concerning the Origin of Fountains.

The Rain Water that deſcends through the Mountains and Plains into the lower Parts of the Earth, is there converted into Currents of Water, that is conveyed through ſubterraneous Channels into the Boſom of the Seas, far below the Level of its Surface. The Exiſtence of ſubterraneous Currents of Water is atteſted by an infinite Number of Relations, as well as by all thoſe who have wrought in the Mines; but as the Generality of People are of Opinion that they come from the Sea, it will be neceſſary to ſhow that they proceed from thoſe Waters that ſink through the Surface of the Earth, and that, on the contrary, they ſilently glide under Ground into the Sea.

Now that the ſubterraneous Waters are produc'd immediately by the Vapours in the Atmoſphere, and not by the Sea, will be eaſily proved. Some Miners have remark'd, that where-ever they had Water under Ground they had Air alſo, and that where the former was wanting, they had not enough of the latter to anſwer the Purpoſe of Reſpiration, and that their Lamps went out: Which proves that the ſame Paſſages that ſerve for the Introduction of Water under Ground, ſerve alſo as ſo many Inlets to the Air, and that theſe Waters come from the Surface of the Earth, and not from the Sea. The ſame Miners tell us, that in ſeveral Mines a great way under Ground, they have been refreſhed with the agreeable Smell of Trefoil-Flower; which may eaſily be accounted for thus: The Waters, after having fallen from the Mountains, and bathed the Meadows, at that time of Year when they are adorn'd with Flowers, extract a Scent which they carry with them thro' the Fiſſures and Chinks of the Earth, filling the circumambient Air with the Fragrancy of odori-

ferous Herbs. Which is another Argument that the Courſe of theſe Waters is from the Earth to the Sea, and not from the Sea to the Earth.

In ſhort we need not have recourſe to any more Arguments to prove the Truth of this Propoſition, That the Waters which drain into the Earth through its Surface, are carried into the Ocean by ſubterarneous Channels, ſeeing we have ſo many Matters of Fact that put it beyond all Contradiction. Several ſuch Streams have been diſcovered to run into the Sea on the Coaſt of *Languedoc* near *Frontignan*, as alſo on the Coaſt of *Croatia* over-againſt *Venice*. And though the Water at the Bottom of the Sea is ſalter by many Degrees than that which is towards the Surface, by reaſon that the groſſer Salts always precipitate to the Bottom, yet very large Springs of freſh Water have been diſcovered to riſe from the Bottom of the Sea. Now whence can theſe come unleſs from the Plains? Among the ſeveral remarkable Occurrences that were the Fore-runners of the burning of *Puzzolo*, which happened in the Year 1538, the Sea retired near two hundred Paces from the Shore, by which means ſeveral Springs of freſh Water were diſcovered bubbling out of the Ground. The Diver that went to the Bottom of the Gulf *Charibdis* to ſeek for the Cup that a King of *Sicily* ordered to be caſt into it, reported that he diſcovered large Springs of Water breaking forth with great Violence from the Bottom of the Gulph. Thoſe Rivers that are ſo often heard and ſeen rolling under Ground, and thoſe freſh Waters that diſcharge themſelves into the Sea underneath its Surface, furniſh us with a very plain and unanſwerable Reaſon, why the Rain-Waters that ſoak down into the Earth do not ſwell and overflow its Surface, explaining at once

onee the Regularity of their Courſe, and the Manner of their Evacuation.

This, according to our Author, is the Sum and Subſtance of all that has been ſaid on this Subject.† It ſeems, upon the whole, there is a perpetual Circulation of Water betwixt the Sea and the Land. Firſt, the Sea-Water aſcends in Vapours, and then deſcends in Snow and Rain, either upon the Mountains or the Plains; that which falls upon the Mountains finds proper Vaſes or Reſervoirs wherein they are collected; then gently ſtealing out in Springs they grow into Rivers, and ſteer their Courſe towards the Sea over the Surface of the Earth, watering the Valleys and Plains as they run along; that which falls upon the Plains, and penetrates deep into the Earth, does likewiſe return through Paſſages under the Ground to the common Rendezvous of Waters.

Hence we ſee the Uſe and Serviceableneſs of Mountains, and at the ſame time that Communication that ſubſiſts betwixt thoſe Parts of Nature which before ſeemed to have no Relation to one another. When the Almighty, inſtead of locking up the Sea within the Bowels of the Earth, thought fit to keep it open and expos'd to the Action of the Sun and the Winds, by which another Ocean of Vapours might be raiſed in the Atmoſphere no leſs uſeful to Mankind, he at the ſame time raiſed great Excreſcencies of Earth, which to outward Appearance indeed have neither Uſe nor Comlineſs, but which, in reality, are highly beneficial, as they ſerve in every

† They that would ſee an Hypotheſis different from this Author's, ſet in a ſtrong Light, and ſupported by very plauſible Arguments, may conſult the learned Dr. *Plot*'s Natural Hiſtory of *Staffordſhire*, chap. II. page 50, *&c.*

every Place, as well in the Middle of Continents as Iſlands, to collect at all times ſuch a Quantity of Water, as is neceſſary to the Formation of thoſe Currents, which are, as it were, the very Bonds of Society, and no leſs neceſſary to the Subſiſtance of Fiſhes, Birds, terreſtrial Animals, and Plants. There is no viſible Relation between the Sea which waſhes the Weſtern Coaſt of *France*, and the Rocks and Mountains which are its Boundaries to the Eaſt; and yet this Sea and theſe Rocks do mutually conſpire to furniſh that Country with one of the moſt neceſſary Elements of Life. The little Hills ſupply it with cryſtal Springs and little Rivulets; but the *Alps* that lift up their lofty Heads between *France* and *Italy* give Birth to the *Rhine*, the *Rhone* and the *Po*; and though the greateſt Part of theſe Mountains is doom'd to an eternal Barrenneſs, yet to them it is owing, that the Countries on each Side of them exhibit all the Beauty and Fruitfulneſs of a well planted Garden. —— Thus are all the conſtituent Parts of the Globe mutually ſerviceable and helpful to each other. The Vapours that are exhaled from the Gulf of *Venice* and the Coaſts of *Holland*, are condenſed and collected by turns in the capacious Reſervoirs of Mount St. *Gotard*, from whence they are diſtributed over *Lombardy*, *France*, and *Holland:* The temperate Zones are fertilized by the genial Warmth they borrow from the Torrid Zone; and this in Return is made habitable by the refreſhing Vapours it receives from thoſe. All Nature is link'd together by one univerſal Law of Harmony and Agreement; and as the whole Earth declares itſelf to be the Work of one only wiſe Creator, ſo it is no leſs evident that the Good of Man was the only chief End and Deſign of his forming it.

ARTI-

ARTICLE IX.

HUMAN OSTEOGENY *explained in two Lectures, read in the* Anatomical Theatre *of the* Surgeons *of* London. July *the* firſt *and* ſecond, Anno 1731. *In which not only the Beginning and gradual Increaſe of the* Bones *of* human Fœtus's *are deſcribed, but alſo the Nature of* Oſſification *is conſidered, and the general Notion,* that all Bones are form'd from Cartilages, *is demonſtrated to be a Miſtake. By* ROBERT NESBIT, *M. D. Fellow of the* Royal College *of* PHYSICIANS, *and of the* Royal Society, *and Reader of* ANATOMY *at* Surgeons-Hall. LONDON: *Printed by* T. Wood, *and ſold by* W. Innys *and* R. Manby, J. Pemberton, E. Symon, J. Noon, *and* C. Davis. 1736. Octavo. *Pagg.* 170, *beſides the Plates, a Dedication to Dr.* JAMES DOUGLAS, *Phyſician in extraordinary to the Queen, and a Preface.*

THE

THE perfecting of *Anatomy* is of ſuch particular Conſequence to Mankind, that, as I have formerly hinted, every Eſſay for the Improvement of it ſhould be treated with a ſingular Reſpect and Candor. A mere civil Reception is hardly an adequate Return for a tedious Courſe of nauſeous Experiments and laborious Obſervations in the real Service of the Publick: Theſe muſt be gone through to qualify a Man for Performances of this kind; and after all, the moſt indefatigable Induſtry has no more than a Chance of being barely approv'd, and no Certainty of the leaſt Recompence either of Profit or Honour, while ſome things of the moſt trifling Concernment are rewarded infinitely beyond what they can poſſibly merit. Methinks it will ſcarce bear a Diſpute which is of greater Moment, cultivating Phyſick and Surgery, or propagating a Breed of Race-Horſes; but I am ſure the Encouragement the laſt receives among us beyond what is given to the former, will bear neither Controverſy nor Reflection.

The Prizes which are annually diſtributed by ſeveral of the *French* Academies, *viz.* of Sciences, Inſcriptions, *&c.* and are conferr'd upon the moſt deſerving, without the leaſt Partiality to Religion or Country, is one of the nobleſt Incentives to Learning, and of the moſt general Influence, as it excites the *Literati* of all Nations to ſtudy and maſter the moſt difficult and uſeful Problems. The many Eſtabliſhments of this kind among that People, are Inſtances of their Munificence and fine Taſte. If it be ſaid we are not behind them in Endowments of this Nature for the Advancement of Knowledge, it will be granted, if the Number and Value only of ours are computed;

ted; in theſe we go even vaſtly beyond them and all others; but if we reſpect either the Conduct of 'em, or the Effects they produce, we cannot, without being too favourable to ourſelves, pretend to an Equality. This Point, I think, might eaſily be prov'd, if this were a proper Place for doing it, or it were my Buſineſs; but as it is not, I am contented with ſuggeſting the thing to others, in whoſe Power perhaps it may be, to ſupply the Defects, or reform the Miſmanagement of our numerous Literary Settlements; few of which at preſent anſwer the true Deſign of the generous Founders.

If the Stipends of the Lecturers at *Greſham* College, to mention no others, were converted into Prizes, propos'd to be beſtowed on any, throughout *Europe*, who ſhould ſolve ſome abſtruſe Theorem which concern'd the common Welfare, clear up a Difficulty in Chronology, Hiſtory or Antiquity, (Amuſements not unbecoming rational Beings) invent any new Art conducing to the Honour and Proſperity of the State, or contrive ſome Method of alleviating the Pains, or increaſing the true Pleaſures of Life, and the Diſcoveries of this Sort were made publick; is there any Compariſon between the Advantages the World would reap from this Inſtitution thus modell'd, and thoſe it now derives from it? Theſe reach but little beyond the private Emolument of the Readers, and fall ſhort of that general Inſtruction they were originally intended for, which no Way ſeems better calculated to promote than this I now ſpeak of.

But I muſt not purſue theſe general Conſiderations any farther: My principal Concern at preſent, is not to be a Solicitor in the Behalf of thoſe who enlarge the Bounds of uſeful Science,

but to point out to the Reader that valuable Addition which our ingenious and inquiſitive Author has here made to it.

No Part of Phyſick or Surgery, as he obſerves, hath received greater Improvements in this or the laſt Age, than Anatomy. This is owing to the frequent Diſſections of all Sorts, both in publick and private, which have been made within that Period; and the careful and induſtrious Application of many Lovers of, and Searchers after natural Knowledge to anatomical Diſquiſitions. Hence have ariſen ſuch conſiderable Advances in the underſtanding both of the Structure and Uſes of moſt Parts of the Body, that, in Compariſon thereof, what the Ancients knew concerning them appears inſignificant and trifling: And yet, as he adds, on a ſtrict Examination it may eaſily be perceived that there ſtill remains much room for Improvement in many Branches of this Art, and in none more, than in ſome Parts of *Oſteology*, eſpecially in that which is the Subject of this Treatiſe.

It is ſurprizing, as the Doctor remarks, that the Writers on this Head ſhould all hitherto be ſo negligent in their Accounts of the Riſe, Progreſs, and Manner of Oſſification in different Parts, from its firſt Appearance to the Time of Birth, that many of its curious and very obvious *Phænomena* have been entirely paſs'd over by them, and not a few others deſcribed or repreſented very different from what they naturally appear to be. Hence no doubt it is, as he adds, that the Truth has been ſo long concealed, and its Place ſupplied by Hypotheſes which had no Foundation but in the Imaginations of their Inventors; altho' the different Times and gradual Manner made uſe of by Nature to produce the Bones of an human Body, make her Operations ſo much more conſpicuous

ſpicuous in thoſe than any other Parts, that by the viſible Effects of Oſſification, a careful and diligent Enquirer may reaſonably expect to come nearer to the Knowledge of its firſt Cauſe, than he can of any other Part of an Animal.

In the firſt of theſe Lectures, our Author has advanced nothing but what is demonſtrable by Preparations of different Parts of human *Fœtus's*; and uſes no Arguments to ſupport his Opinions, but ſuch as may fairly be drawn from Nature it ſelf; his End not being to ſhew the Falſity of another Hypotheſis, only to eſtabliſh one of his own, which might be as liable to Objections, and have as little Foundation in Nature, as that he propoſes to confute. Therefore after he has given a ſhort Deſcription of the *Perioſteum*, and an Account of what Sort of Subſtance a Cartilage is, he relates, what is viſible of the manner of Oſſification, and from that ſhews the ancient and common Notion of all Bones being originally cartilaginous, to be a vulgar Error: He then enquires whether the related Effects of Oſſification do not almoſt help us to the Knowledge of the immediate productive Cauſe of bony Subſtances; and afterwards examines the Objections that have or probably may be raiſed to his Account.

In the ſecond Lecture he gives an exact Deſcription of the apparent Difference there is naturally to be perceived between the Parts of a freſh or undried Skeleton of a full grown human *Fœtus*, and the Skeleton of an Adult, and alſo briefly mentions in what manner, and at what Time, each Bone and its ſeveral Parts increaſe and vary from its firſt Appearance to the Time of Birth. In doing of this he forbears deſcribing or taking any more Notice of the Figure and Shape of theſe Bones, than what is neceſſary to exhibit

in

in what they differ from full grown ones. Therefore he ſuppoſes his Readers thoroughly acquainted with the adult Oſteology, for which Reaſon he has likewiſe omitted deſcribing the Ligaments, and giving an Idea of the Articulations or any thing elſe that is uſually obſerved of theſe Parts, which is not neceſſarily or beſt explained by Preparations from *Fœtus's*. He thought it not neceſſary for illuſtrating this *ſecond Lecture*, to follow the Example of *Kerckringius*, in giving Sculptures of every Part of a *Fœtus* of each Month from the ſecond after Conception to Birth; becauſe theſe Parts do not in every Month differ in Shape or Subſtance, tho' they do in Magnitude, and therefore he has only exhibited Figures from three or four *Fœtus's* of a different Age. Indeed he once purpoſed, as he ſays, to have given Repreſentations of the *Perioſtium*, Cartilages, and Bones injected, from exceeding curious Preparations in the Muſeum of Dr. *Nichols*; but he was deterr'd from purſuing that Deſign by the Difficulty he found in getting thoſe ſmall Veſſels accurately and diſtinctly drawn. And it was for a like Reaſon he was prevented from giving Draughts of whole Skeletons, finding it was hardly poſſible to fix an undried and well cleaned Skeleton of a *Fœtus* in a natural Poſture, ſo as to take the Out-line true and beautiful. The Sculptures relating to this Treatiſe come ſomewhat ſhort, he confeſſes, of what he deſign'd and expected; tho' he hopes, as to Exactneſs, when compared with the beſt of any kind yet publiſhed, they will not appear inferior to the moſt correct; becauſe the Out-lines of moſt of the Figures, eſpecially thoſe of the full-grown *Fœtus*, were taken in a *Camera obſcura*, and therefore cannot deviate greatly from the Truth.

The Doctor has entered into an unbeaten Path, and he very juſtly wonders, ſince Deſcriptions of adult Bones have been frequently publiſhed by able Hands, that ſome Perſon has not attempted to give an exact Account of the Time when, and the manner how, each Bone and its various Parts increaſe and alter, (at leaſt) from the Time of Birth to that of its Maturity: Such an Account is abſoiutely neceſſary to perfect the oſteological Part of Anatomy, and would not only be entertaining, but alſo very uſeful both in Phyſic and Surgery. It is evident to him, by the few Diſſections only, which he has made on that Account, that to the unhappy Neglect of this it is owing, that ſome Diſtempers of Bones and Cartilages have hitherto been not only imperfectly, but falſly deſcribed; and none more than that peculiar to Children, called the *Rickets*, the Knowledge of which, he is ſatisfied, might be ſo far improved by the Help of proper Diſſections, as to afford ſufficient *Data*, from which we might deduce a rational Method of Cure. Therefore he purpoſes, if Opportunity offers, to diſſect more of theſe morbid Subjects, that he may be able to give the Public a brief Account of that Diſtemper, and others of a like Nature, incident to bony Parts, wholly grounded on very manifeſt *Phænomena*, which he conceives are always viſible within ſuch diſeaſed Parts, altho' they have not, as far as he knows, been as yet obſerved, or at leaſt deſcribed by any Author.

The greateſt Part of this Work having ſo cloſe a Connection with the annexed Figures, as to be wholly unintelligible to the generality of Readers without them, it would be abſurd to attempt any Abſtract of it; all therefore I ſhall add to the foregoing general Account is, the Author's ingenious

nious Argument to prove, *That the Notion of all or any of the Bones being formed originally from Cartilages (according to the received Opinion) is a Miſtake, and without any Foundation in Nature.*

" It is at preſent, ſays he, almoſt univerſally " allowed, that all thoſe Juices which are the " productive Cauſes of the Accretions of each " Part of an animal Body, are originally deduced " from the Maſs of Blood, and formed by diffe- " rent Coalitions of various combined Particles " contained in it; which Particles, by the Pow- " er of Circulation and Attraction, are ſecreted, " and forced into Veſſels capable in a natural " State of receiving only ſuch, and through " them conveyed to the Parts deſigned to be " augmented. And it is as univerſally denyed, " that the Juice, which is the primary Cauſe of " the Productions and Accretions of the Bones, " is capable of generating perfect bony Subſtan- " ces, without firſt forming a cartilaginous one.

" But by what hath been related * of the Be- " ginning and Progreſs of bony Productions in " different Parts of *Fœtal* Bodies, it appears to a " Demonſtration, that ſome Bones begin and " continue to increaſe until they arrive at Matu- " rity, without the leaſt Appearance of Carti- " lage in or round them; and that others, tho' " they are generated within Cartilages, have not " in or about them a Quantity of cartilaginous " Subſtance exiſting, as long as they continue to " grow, ſufficient to afford Matter for their In- " creaſe in Bulk or Solidity; conſequently, if a- " ny part of a Bone be produced by a Tranſmu-

* In the foregoing Part of this firſt Lecture, where the Subſtance of the Bones is defined, and the two Species of Oſſification, *viz.* between Membranes, or within Cartilages, are very diſtinctly and perſpicuouſly deſcribed.

" tation of a Cartilage, Nature muſt uſe diffe-
" rent Methods at different Times to generate
" and accrete the ſame Bone.

" But as nothing is more certain, than that
" Nature is never at unneceſſary Trouble in any
" of her Performances, and is always ſo confor-
" mable to herſelf, as ever to operate uniformly
" in the moſt eaſy and ſimple manner, ſhe can-
" not reaſonably be ſuppoſed to produce ſimilar
" Subſtances in the ſame Body, and at the ſame
" time, from different Origins, and in different
" Manners.

" And what may be ſeen of Bones ſlipping
" out of the cartilaginous Cavities, in which
" they were generated and contained *, affords a
" plain autopical Demonſtration of the entire In-
" dependance of thoſe two Subſtances on one an-
" other, as can be had, or reaſonably expected
" of Things of this Nature.

" And beſides, as a farther Conſideration, if
" we examine Oſſification ever ſo accurately in
" any aged Subjects, we ſhall never find any
" Particles or Fibres in a middle State between
" Bone and Cartilage; which ſurely would ſome-
" time or other happen to be apparent, if the
" ſofter Subſtance was gradually tranſmuted into
" the harder.

" That

* How the *fœtal* Bones are dependant upon the Cartilages wherein they are generated, may be made appear, ſays our Author, *page* 21. if any of them, while the Cartilages entirely or almoſt ſorround the Bone, be kept a ſufficient Time in Water; for then on ſlitting the Cartilage, the Bone will, as ſoon as the large Veſſels that enter its Subſtance are divided, ſlip as eaſily, if not eaſier, from it than an Acorn does out of its Cup. And by the Smoothneſs and Poliſh of the Parts of both Cartilage and Bone, which were in Contact, it is very manifeſt, there could be no Intermixture of their Particles, or Continuation of the Fibres of one Subſtance to thoſe of the other.

"That the Formation of all bony Subſtances "is immediately cauſed by ſecreted Fluids, may "be ſufficiently proved by the *Phænomena*, "which have been ſhewn to exiſt always in car- "tilaginous Parts, juſt before and after Oſſifica- "tions within them become viſible * : From

 "all

* Thoſe Cartilages of almoſt full grown *Fœtus's*, in which are to be found either Tendencies to oſſify, or Oſſifications juſt beginning, plainly ſhew that not one bony Particle is to be perceived or felt, before there is a viſible Influx into the Cartilages of a Fluid different from what uſed to flow through them: In oſſifying *Epiphyſes* cut tranſverſly we may diſcern both in ſuch as have no viſible bony Particles, and others which have a few, many of thoſe Veſſels, which while the Part continued totally cartilaginous without a Tendency to oſſify, were too fine to be diſtinguiſhed by the greateſt magnifying Microſcopes, and conſequently too ſmall to admit the red Globules of Blood to flow freely thro' them, appear to have been, by a more than uſual Afflux of Fluid into them, ſo much dilated, as to receive a Quantity of red Globules, ſufficient to make ſome Part of them diſtinctly viſible to the naked Eye, and to cauſe in and near the Place where the Oſſification is to begin, and round it, always when juſt begun to be apparent, and frequently after it is conſiderably increaſed, the Appearance of an Inflammation.

The firſt ſmall Corpuſcles of Bone, which become viſible, are always in that part of the Cartilage which has the greateſt Quantity of red Fluid appearing in it, and are often at ſmall Diſtances from each other.

In ſome of the Veſſels, which are much dilated, and appear full of Blood, or a Fluid very ſimilar to it, there are often to be felt, hard gritty Particles.——In ſome *Epiphyſes* there are often three or more very conſiderable Veſſels going to and penetrating the Oſſifications, within which Veſſels, and ſuch like, at their Ends near the Oſſification, one ſhall rarely miſs feeling, by the Point of a Knife, bony Particles.—In the little red Specks, which ſometimes appear with one or more ſmall Veſſels ending in them, on Sections of *fœtal Epiphyſes*, bony Particles are generally to be felt, and ſometimes even ſeen.—This much is evident from *fœtal* Preparations, of the manner in which theſe Sort of Bones begin and continue until Birth to be generated; but on Examination of the ſame Parts in Children of three or four Years old, the like *Phænomena* will be much more apparent. *Theſe are the*

Phæno-

" all which it plainly appears, that Nature never " fails to ſupply all cartilaginous Parts, both a " little before and during the Time Oſſifications " are forming within them, with a Quantity of " a Fluid very different from what at any other " Time is naturally to be ſeen in any Part of " them. And the Appearance of bony Particles " only in that Fluid, ſeems to prove that neither " the ſolid nor fluid Parts of cartilaginous Sub- " ſtances are in the leaſt concerned in bony Pro- " ductions.

" That the Blood is capable at all Times of " Life of generating and ſuſpending a Subſtance " perfectly analogous to the cretaceous Parts of " Bones, is demonſtrable by the chemical Analy- " ſis of thoſe cretaceous Subſtances, which are " frequently found to be ſeparated along with " the Urine from the Blood; as likewiſe thoſe " Subſtances commonly called *Chalk-ſtones*, of- " ten generated in various Parts of gouty Bodies.

" What has been obſerved concerning the " different Manners of bony Productions, and " the *Phænomena* which are viſible during the " Progreſs of Oſſifications within cartilaginous " Parts, are fully ſufficient to prove all bony Par- " ticles * to be originally contain'd and ſuſpend- " ed in the Blood, or a Fluid ſecreted from it, " which may be called the *oſſifying Juice*, much " in the ſame manner as ſtony and ſaline Parti- " cles are very frequently found in ſome of the " moſt tranſparent Spring-Waters.

" And

Phænomena *above referr'd to, as they are deſcribed in the* 17*th*, 18*th and* 19*th Pages of this Treatiſe.*

* Our Author would not be underſtood here to mean thoſe bony Particles he ſpeaks of in the foregoing Note as viſible, but the ſmalleſt Particles or *Corpuſcles* rather, of ſuch like Matter, by the Coheſion of a Number of which the apparent ones are compoſed.

" And by the ſame *Phænomena* it ſeems to be " demonſtrable, that the oſſifying Juices are ſe- " creted and conveyed to the Parts deſigned to " be by them generated or accreted, thro' Veſ- " ſels peculiarly formed for that Purpoſe; and " that they are by the Force of the Circulation " puſhed on to the Beginning of the Veſſels pre- " pared to receive refluent Juices, which, as ap- " pears by the Obſtruction in ſome Meaſure of " part of the circulating Fluids, in a Place be- " ginning to oſſify, being ſo ſmall, as to permit " only the finer and more aqueous Parts of this " Juice to enter and paſs forward, the groſſer " conſequently muſt be left behind; by which " means their Particles approaching nearer each " other, have their attractive Force ſo increaſed, " as ſufficiently to draw one another into a Co- " hefion ſtrong enough to form ſmall hard Cor- " puſcles, much in the ſame manner as the Par- " ticles of Salt attract one another, and unite, " ſo ſoon as a ſufficient Quantity of the Water " in which they were ſuſpended is evaporated.

" And as it is well know by *Ruyſch*'s Experi- " ments, that the Blood is capable of forming " fine Membranes, it ſeems to be much more " conſiſtent with the Appearances of Nature, to " ſuppoſe thoſe membranous Parts of a Bone, " which act as a *Gluten* to keep theſe Particles " and Fibres together, if there be any ſuch that " do not ariſe from the Coats of its Veſſels, to " be produced by a Coheſion round the creta- " ceous Particles of a Part of the Fluid, in " which they were generated or contained, than " to reckon them Parts of the Cartilage, in " which the Bone firſt becomes viſible; becauſe " it is very plain by Inſpection, that as the bony " Particles are depoſited within dilated Veſſels,

" the Coats of thoſe Veſſels prevent the cartila-
" ginous Subſtances ever coming into Contact
" with moſt of thoſe Particles."

It muſt be owned, our Author's Reaſoning upon this Topic carries with it the Air of a Demonſtration; but for pronouncing it abſolutely concluſive, we muſt ſee the ſeveral Objections that may be raiſed to it, and are the Grounds of the contrary Opinion, ſatisfactorily anſwered; and this the Doctor attempts, with no leſs Appearance of Succeſs, in the following Paragraphs.

" One of the chief Arguments, ſays he, made
" uſe of to ſupport the vulgarly receiv'd Notion
" of the Cauſe of Oſſification, is drawn from
" the ſuppoſed Change of Cartilages into Bones,
" which often preternaturally happens in both
" young and old, and is frequently urg'd as an
" indiſputable Proof of the natural Tendency of
" that Subſtance to become Bone.

" But the frequent Oſſifications (as he replies) of
" muſcular, tendinous, and membranous Subſtan-
" ces, as well as cartilaginous, ſhew no more peculi-
" ar Property to be in the cartilaginous Subſtance
" to turn Bone, than in any other. On Exami-
" nation of any of theſe preternatural Productio-
" ons of Bone, in Parts that are cartilaginous or
" otherwiſe, whether they ſeem to be bony In-
" cruſtations, as is moſtly the Caſe, or no; the
" Bulk of the oſſified Part is never leſſen'd, but
" always appears ſufficiently augmented to prove,
" paſt all Diſpute, that there had been a Quan-
" tity of Matter, proportionable to its Increaſe
" or Alteration, depoſited in or upon it: which
" demonſtrates even theſe preternatural Oſſifica-
" tions not to be produced, by an Expreſſion or
" Exhalation of the more liquid Part of the Sub-
" ſtance about to oſſify, in order to make way

" for its earthy and more ſolid Particles to ap-
" proach near enough together to acquire the
" Hardneſs, and cauſe the Appearance of a bony
" Subſtance; becauſe if it had been in that man-
" ner generated, the Bulk of the Part muſt ne-
" ceſſarily, by oſſifying, have been greatly dimi-
" niſhed, the Bulk and Weight of all animal
" Subſtances, except Bone, depending indiſpu-
" tably much more on their fluid, than ſolid
" Parts.

" The pretended Reduction of Bones into
" Cartilages by ſteeping them in Vinegar, which
" cauſes what remains of them to become flexi-
" ble, and while wet very ſoft, is ſo far from
" ſhewing, as the Advocates for this Opinion
" imagine, that the bony Subſtance is liable to
" be changed or reduced to a cartilaginous one,
" that, on the contrary, it proves all thoſe cre-
" taceous Parts to be entirely taken away, which
" the Vinegar could penetrate to. For what re-
" mains, is only its membranous Part, which the
" Acid cannot operate on, as it does on the cre-
" taceous, which it ſoon diſſolves by Fermenta-
" tion.—And this membranous Subſtance which
" is left, is ſo far from having the Reſemblance
" of a cartilaginous one, that it is always very
" ſpongy, whereas a perfect uniform Solidity is a
" conſtant and never-failing Property of all true
" Cartilages.

" But by way of farther Objection, as the
" Doctor ſays, it will be ask'd, *What becomes of*
" *thoſe Cartilages in which Bones are generated, if*
" *they be not by Induration, Compaction, or ſome*
" *other Method, tranſmuted into bony Subſtances?*

" To this it is anſwered, That thoſe Cartila-
" ges, by the great Influx of various Fluids into
" them, and the continual Increaſe of the bony

" Subſtan-

" Subſtances, are ſo extended, as to loſe totally " all the Properties of Cartilages; and what re- " mains of them becomes in moſt Parts a Mem- " brane ſo exceeding thin, as to be altogether " imperceptible: Therefore thoſe Cartilages may " truly be ſaid to be entirely deſtroyed.

" It may be yet queried, *Why any Bone, or bony* " *Subſtance, is generated within a Cartilage, if that* " *Subſtance in no Degree affords Matter to cauſe* " *its Production or Accretion?*

" The compleat Anſwer to this Queſtion is " contained in the Account that is given in the " Sequel of theſe Lectures, of the Time, when " each bony Part of a *fœtal* Body is generated. " For by that it appears, Nature never produces, " in any Part of the Body, a bony Subſtance, as " long as a leſs hard one of equal Magnitude can, " with like Benefit to the Creature, ſupply its " Place.——Therefore, in order to keep a pro- " per Symmetry and Proportion, at all times, in " every Part of a fœtal Body, it was abſolutely " neceſſary thoſe Places, in which Bones were " afterwards to be generated, ſhould be filled " with a cartilaginous Subſtance, the Solidity " and Hardneſs of which being nearer to that of " Bones, than any other in an Animal, is conſe- " quently the moſt proper to ſupply their Places. " —Beſides, the Cartilage in theſe Parts ſerves " alſo as a Bed for the bony Fibres to ſhoot ſe- " cure from any Impediment or Injury they " might be liable to receive from the Motion of " the *Fœtus*, or external Preſſure.——The Con- " ſideration likewiſe of the Uſe of thoſe Bones " which are form'd between Membranes, help us " to the Reaſon, why they are never ſurrounded " by cartilaginous Subſtances, and are the firſt " generated and perfected. For we find moſt

" of

" of theſe Bones, even when their Oſſifications " are far advanc'd, to be either ſo exceeding " thin, or ſo very ſmall and ſlender, that a carti- " laginous Subſtance of their Size could not have " much more Solidity than the Membranes be- " tween which thoſe Bones are produced; and " while the *Fœtus* is ſo ſmall, the Motions of it " cannot be ſufficient in any degree to impede " the natural Progreſs of the Oſſifications. As " for Example, we find the Clavicles and Ribs " to be oſſified, even when they are ſo ſmall, " that it is demonſtrable from the Conſideration " of the Uſe they are deſign'd for (which is to " keep the *Thorax* always ſufficiently dilated) that " no other animal Subſtance but Bone of their " Size cou'd be ſufficient to perform that Office.

" Hence, to conclude, ſays our Author, we " ſee by a careful Examination of Nature's Ope- " ration in the bony Parts of fœtal and young " Bodies, that there is not one *Phænomenon* to " ſupport that Notion of Bones being nothing " but indurated Cartilages, or that they are pro- " duced only by a Tranſmutation of a cartilagi- " nous Subſtance. And there are abundant Proofs " that the Blood, or a Fluid ſecreted from it, is " capable of producing bony Subſtances, with- " out firſt forming cartilaginous ones. It like- " wiſe appears, that the moſt material Argu- " ments which have been uſed to ſupport the " common Hypotheſis, may with much more " Reaſon be uſed to overturn it.

ARTI-

ARTICLE X.

PSALMORUM LIBER, in *Verſiculos metrice* diviſus, & cum aliis *Critices ſubſidiis*, tum præcipue *Metrices Ope*, multis in Locis Integritati ſuæ reſtitutus. Cum DISSERTATIONE de *antiqua* Hebræorum *Poeſi*, aliiſque Quæſitis, ad *Pſalmorum Librum* pertinentibus. Ad Finem Operis adjecta ſunt *Poeſeos Hebraicæ Specimina*, ex iis quæ ediderunt, *Franciſcus Gomarus*, *Marcus Meibomius*, & *Johannes Clericus*. Edidit *Franciſcus Hare*, S. T. P. Epiſcopus *Ciceſtrenſis*.

That is,

The Book of Pſalms *divided metrically into Verſes, and in many Places corrected and reſtored to its original Purity, according to the Rules of Criticiſm, eſpecially thoſe relating to Poetry: With a Diſſertation on that of the ancient* Hebrews, *as alſo on their Muſick and muſical Inſtruments*;

on

on the Author of theſe divine Songs, the Collector of them into one Volume, and on their Order, Chronology, and Titles. To all which are added a few Specimens of the Hebrew *Poeſy, extracted from what has been publiſhed on that Head by* GOMAR, MEIBOMIUS, *and* LE CLERC. *By* FRANCIS HARE, S. T. P. *Biſhop of* Chicheſter. London: *Printed by* W. Boyer, *for* S. Buckley, *and* T. Longman, 1736. *In two Volumes* Octavo, *containing* 403 *and* 449 *Pages; beſides the Preface and preliminary Diſcourſe.*

THIS Work deſerves the peculiar Approbation of the Learned, as it is an Attempt to add to their Treaſure a new Acquiſition, in which they have not only been hitherto deficient, but which, tho' very deſirable, they have long ſince given up the very Hope of.

The nobleſt Diſcoveries have been accidental, and have riſen from Incidents which promiſed no ſuch Conſequences; and this of our learned Author is owing to an accidental Diſcourſe concerning the Word *Selah*, and *Meibomius*'s Interpretation of it. It was what occurr'd in that Converſation which ſet him on inveſtigating the Genius and Rules of the *Hebrew* Poeſy; Things that have been buried in Oblivion above two thouſand Years, and their Reſurrection altogether deſpair'd of.

There

There were two *Data* to proceed on immediately obvious and certain; Firſt, that ſome Books of the ſacred Scripture were really poetical: This is a Point univerſally allowed both by Jews and Chriſtians. Secondly, that there can be no Poetry which is not governed by ſome *Meaſure*: To ſuppoſe the Affirmative is a downright Abſurdity; nor could Men of the greateſt Erudition have imagined that of the *Hebrews* to be ſubject to none, if they had not confined their Ideas of Metre to that Species of it which obtain'd amongſt the *Greeks* and *Latins*, and conſiſted eſſentially in the Quantity, and not the Number of their Syllables.

But if ſome Books of the Old Teſtament are written poetically, that is, in a Style formed by metrical and numeral Laws, what ſhould hinder thoſe Laws being found out and determined, if, by an accurate Scrutiny, we can be aſſured of the exact Number of Syllables each Word is compoſed of? And in this Matter our Author thinks there could have been no inſuperable Difficulty, provided the *Hebrew* Rabbi's had handed down to us the genuine manner of reading that Language, had pointed the ſacred Books exactly, and tranſmitted to us the Text itſelf entire and uncorrupted. So that the Nature and Rules of the Jewiſh Poetry continuing ſo long unknown, and evading the indefatigable Reſearches of the moſt ſagacious Enquirers, as they have ever heretofore done, is to be attributed, as he reckons, to our having hitherto been wrong in all the aforementioned Particulars; being perſuaded, that we have all along been miſtaken in the Way of reading the *Hebrew*, miſled by the *Maſoretic* Points which are improperly plac'd; and that the ſacred Books themſelves (liable to the Fate of all

all ancient Writings) have deviated greatly from their firſt Purity, thro' the unavoidable Injuries of Time, and the Ignorance and Careleſneſs of Tranſcribers; all which he labours to prove in the preliminary Diſſertation.

And he deelares it to be his Opinion, That the ſacred Literature will never arrive to any Perfection, nor Commentators be able to reduce the Scriptures to their primitive Standard, or ſet them upon a Level for Correctneſs and Integrity with prophane Writings, till they treat 'em in the ſame Method, and reform them by the ſame Rules and Principles as they proceed on with reſpect to heathen claſſical Authors. Whereas, on the contrary, Interpreters ſeem in this Inſtance to fetter their Judgments, and be afraid of exerciſing their Underſtandings freely in the Examination of the divine Oracles; as if in this Caſe they had no Liberty, and were reſtrained by ſome Authority that was ſuperior to the Dictates of Truth and Reaſon. Nay, the generality of Expoſitors, inſtead of ſearching out the Errors and Imperfections which have crept into the Bible, in order to remove and correct them, employ all the Talents they ſhould exerciſe in that commendable Task, to ſcreen, to vindicate, and even to conſecrate them; not labouring to reſtore the true Senſe in Places where it is perverted and deprav'd, and where perhaps a ſmall Emendation would rectify it; but contend for the received Reading, and enforce the Propriety of that, whatſoever it be, by harſh and unnatural Conſtructions, in Oppoſition to all the Laws of Grammar and Criticiſm.

This illuſtrious Prelate has taken a very different Courſe in the Proſecution of his Deſign; he has called in all the Aids of Criticiſm, which he would

would have made uſe of, if his Buſineſs had been with any other obſcure and difficult Writing; he diveſted himſelf of all intimidating Apprehenſions, and religious Prejudices, eſpecially thoſe which have infatuated ſo many, in Favour of the divine Origin of the *Hebrew* Points, and the abſolute Perfection of the Old Teſtament; which our Forefathers were too eaſily perſuaded to believe, on the Teſtimony of the *Jewiſh* Doctors: ſince nothing can be more evident than this, That if the *Literati* had been under the Influence of ſuch Notions with regard to other Books of the Ancients, human Learning had yet been ſunk in Ignorance and Barbarity, and thoſe *Greek* and *Roman* Authors that now afford ſo profitable and elegant an Entertainment, had been in the ſame deplorable Condition in which the Critics received the firſt Editions of them after the Invention of Printing.

'Tis certain, that ſuch a Turn and Diſpoſition of Mind, ſuch Vigor of Reſolution, was requiſite to the Succeſs of ſo important an Undertaking as this, and the Method in which his Lordſhip purſued it was equally judicious. He has deſcribed the ſeveral Steps of it in his Preface, and they may ſerve as a Pattern for others, who are willing to engage in a like glorious Enterprize.

It is not to be expected that all even of the Learned ſhould immediately acquieſce in his Lordſhip's Sentiments; ſome at firſt may think him entirely miſtaken, and others ſuſpect he has not been ſo fortunate in his Diſcovery as he ſuppoſes. It will ſcarcely be credited, that what the greateſt Maſters of the Language, the moſt diligent Enquirers into the Learning and Antiquities of the *Hebrews*, have been at infinite fruitleſs Pains

to

to inveſtigate, and have finally declared to be inſcrutable, ſhould now at laſt be found out by one who has made no mighty Figure in thoſe Studies, nor aſſumed the Rank of *Buxtorf*, *Scaliger*, *Calmet*, *Capellus*, *Carpzovius* or *Pfeiffer*; but Men of Senſe will ſoon extricate themſelves from ſuch irrational Prepoſſeſſions, and when they ſee the Fact, will no longer fancy it to be impoſſible, becauſe they have tried it ineffectually, or ſome whoſe Judgment and Erudition they reverence have pronounced it to be ſo: Nor will Men of true Wiſdom envy, or derogate from the Honour of this Invention, but rather applaud the Meaſures the noble Author has taken for raiſing it to Maturity, and employing it at once in the Service of God and the *Republick of Letters.*

It is even beyond Expectation, that an Eſſay on ſo difficult a Subject as this relates to, ſhould be inſtantly perfect; our Author has no ſuch Preſumption; he is ſenſible how eaſily he might err in ſuch a Number of Verſes as he had to deal with, almoſt ſeven thouſand: He hopes therefore his Readers will have no leſs Equity than Learning, and convinc'd of the Arduouſneſs of his Task, candidly paſs over or amend the Errors of his Performance: Eſpecially when it is conſider'd, that however he may have miſtaken in Circumſtantials, he has not fail'd in what he principally propos'd, but happily recovered the *Hebrew* Poetry, reviv'd its genuine Form, and reſtor'd it to the deſiring World entire, after a Sepulture of many Ages. This he is firmly perſuaded of, and is confident, the Men of Letters, when they have impartially ſurvey'd the Proofs he has produc'd, will ingenuouſly acknowledge it.

I might here very properly introduce his Lordſhip's Diſſertation in which they are contain'd;

but as that would require a larger Compaſs than can now be afforded, or muſt be contracted within narrower Bounds than ſo many curious Particulars will admit of without Injury, I chuſe to mention it no farther at this time, but only acquaint the Reader with the Form and Method of the Work to which it is prefixed.

On one Hand appears an accurate Impreſſion of the original Text, in *Hebrew* Letter, unpointed, divided into Verſes conſiſting of ſo many diſtinct Periods, ranged one under another, and diſtinguiſhed by Spaces and Figures; the Points called *Soph Paſuc*, which determine the Periods of the *Maſora*, are retained; and where there ſeemed to have been ſomething omitted in the Copy the Biſhop made uſe of, the Number of the Syllables ſuppoſed to be wanting are denoted by ſo many *Aſteriſms*. On the oppoſite Page we have the ſame Text, with our Author's Emendations, expreſs'd in *Roman* Characters; his Additions and Alterations are printed in *Italick*; and what he rejects as ſuperfluous, is animadverted on in the Notes, or will be immediately obvious to the *Hebrew* Reader. Under the Original, on both Pages, is the *Latin* Verſion of *Leuſden*, accommodated to the Text corrected by our Author, and altered in a few Inſtances where that of *D'Muis* is to be preferr'd to him: At the Bottom of the Leaves there are Notes, for juſtifying the Biſhop's Amendments of the Text, marking the parallel Places, or illuſtrating ſuch Paſſages in it as are difficult.

His Lordſhip has wholly omitted the Arguments of the Pſalms; they are in all the uſual Commentaries, and he was afraid, by inſerting 'em, of enlarging the Bulk of the Work beyond the Convenience of thoſe it was deſign'd for:

What he has thought fit to be ſaid vpon the Titles of them, is in the preliminary Diſſertation. The Specimens of *Hebrew* Poetry at the End, are ſelected from three celebrated Writers. They are, an Analyſis of the cxith *Pſalm*, by *Fr. Gomar*; the xxiiid and xcvth *Pſalms*, by *Meibomius*; and the xxxiid of *Deut.* by M. *Le Clerc*. The Biſhop ſhews they are all miſtaken in what they intended, and points out the Grounds of their Errors: He has reduced the xxxiid of *Deut.* to the true *Hebrew* Meaſure, and given it us, on oppoſite Columns, along with that of M. *Le Clerc*.

ARTICLE XI.

The TALES *and* FABLES *of the late Archbiſhop and Duke of* Cambray, *Author of* Telemachus, *in* French *and* Engliſh. *Written originally for the Inſtruction of a young Prince; and now publiſhed for the Uſe of Schools. To which is prefix'd, An Account of the Author's Life, extracted from the Memoirs of the Chevalier* Ramſay, *Author of the Travels of* Cyrus. *With a particular and curious Relation of the Method obſerved in training up the young Prince, even from his Infancy, to Virtue and Learning. The Tranſlation in-*

to Engliſh *by a Gentleman of the* Inner-Temple. *The whole illuſtrated with twenty-nine Copper Plates, engraven by* G. Bickham, *junior.* London: *Printed for* J. Hawkins; *and ſold by* John Osborn, *at the* Golden-Ball *in* Pater-noſter Row. 1736. Octavo. *Pagg.* 164, *beſide the Archbiſhop of* Cambray's *Life.*

THIS Work may be regarded as the Trifling of a great Genius, but it is well adapted to the Purpoſe it was deſign'd for by its illuſtrious Author. Little as it appears to be in its Nature, it is productive of greater Conſequences, and diſcovers throughout, the Signatures of a Mind intent upon propagating Knowledge and Virtue. The Principles that Youth will imbibe in the reading of it are the Seeds of all Happineſs, and they will be entertain'd the more readily, as they are repreſented under thoſe Images which delight the Imagination: The Writer of theſe Tales could have choſen ſublimer Subjects, and enlivened the Recital with a thouſand raviſhing Incidents; but this would really have been a Fault, and acting out of Character, when he condeſcended to be the Inſtructor of Children, and pretended to comply with their Capacities. Theſe Stories are to be what Alteratives are in Phyſick, and they are wiſely ſuited to the weak and tender Conſtitutions on which they are to operate.

There is ſcarcely one of them that does not convey ſome profitable Leſſon; the Adventures of *Meleſichton* are an admirable Repreſentation of the

the Vanity of what ſome term Greatneſs of Spirit, and other heroic Qualities, without Prudence and Oeconomy; and at the ſame time diſplay to us, in a manner extremely inviting, all the beneficial Fruits of thoſe fortunate Properties.† The Hiſtory of *Alibeg* the *Perſian* ſhews us the Viciſſitudes of Life, with the Safety of an obſcure one; how little Preferment and even the ſplendid Honours of a Court conduce to our Felicity, as they expoſe us only the more to the Blaſts of Envy, and the Machinations of malicious Men; that the moſt generous Views, the moſt diſintereſted and upright Behaviour are not always a Defence againſt Slander, nor will ſave from Suſpicion; and that Humility in Proſperity and Grandeur is of infinite Advantage, as it diſarms our Enemies, engages Friendſhip, and inſpires that Reſolution of Mind that is Proof againſt all Misfortune, and is frequently victorious over the moſt violent Perſecutions.

Thus I could point out the Moral of each Fable, and deſcant upon the uſeful Truths that are inſinuated under theſe Fictions; but it would ſignify little here; and it will increaſe the young *Tyro*'s Pleaſure, to whoſe Peruſal I would recommend the Book, to diſcover them for himſelf.

Waving therefore any farther Mention of theſe, I ſhall fill up the remaining Pages of this Article, with a few Particulars of the Life of the incomparable Author, which is prefix'd to them. It is extracted from the Memoirs of him wrote by M. *Ramſay*, who lived with him for ſome time in a State of great Intimacy, and was proſelyted by him to (what he calls) the Catholick Religion. However, this Inſtance of Mr. *Ramſay*'s

† Si ſit Prudentia, nullum Numen abeſt. *Juv.*

Weakneſs need not give us the leaſt Suſpicion of his miſtaking or exaggerating the Character of his Patron and ſpiritual Father, or infuſe any Diſtruſt of his Account, ſeeing all the World is agreed in attributing to the Archbiſhop of *Cambray*, all the great Qualities and Virtues that he here celebrates.

That excellent Perſon was deſcended from a very ancient and reputable Family. He was born on the 6th of *Auguſt* 1651, at the Caſtle of *Fenelon* the Seat of his Father, who was Marquis of *Fenelon*, and brought up under the Direction of private Tutors in the Houſe under the Eye of his Parents, till he was twelve Years of Age, and was thereby preſerved from that Corruption both in Principles and Morals, which is too often and too ſoon conſpicuous in young Noblemen who are indulged in a Court Education. From his Infancy he gave ſignal Marks of a ſweet Diſpoſition and a ſprightly Genius.

He was firſt ſent to the Univerſity of *Cahors*, for the Improvement of his Studies, (being intended for an *Eccleſiaſtic*) and from thence to *Paris*, in order to finiſh them, under the Care and Inſpection of his Uncle *Antoine* Marquis *de Fenelon*, Lieutenant-General of the *French* Army.

Here he ſoon diſplayed his ſuperior Talents under the Favour and Protection of ſuch a Friend, who entertained him in his own Houſe, and careſs'd him with all the Indulgence of a Parent. He ſoon made himſelf ſo conſpicuous, that at the Age of nineteen he preached in publick, with univerſal Approbation. His Uncle, however, fearful leſt he ſhould grow vain and ambitious by ſuch a Flow of popular Applauſe, obliged him, for avoiding ſo pernicious a Conſequence, to remain ſilent ſeveral Years afterwards, till he ſhould acquire more Solidity of Wiſdom to withſtand it.

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Upon this Injunction, he applied himſelf cloſer than ever to his Exerciſes, and the Practice of all thoſe Virtues which are the ſhining Ornaments of his Rank and Profeſſion, under the Tuition of Mr. *Tronſon*, Superior of the Seminary of St. *Sulpicius*. When he was about twenty-four Years of Age, he entred into holy Orders, and perform'd all the Functions of the Prieſthood with an edifying Piety. He underwent the hardeſt Parochial Labours with Alacrity and Chearfulneſs, and thought nothing below him which was requiſite for the Diſcharge of his Office.

At twenty-ſeven Years of Age, M. *de Harley*, then Archbiſhop of *Paris*, made choice of him to be Superior of the Community of Women in that City, who were new Converts to the *Romiſh* Religion. His Induſtry and Succeſs in that Station ſoon diſcovered how well he underſtood the Art of Perſuaſion, and of reconciling others to his Sentiments. The King was informed of his extraordinary Qualifications, and in the Year 1686 nominated him chief Miſſionary on the Coaſt of *Saintonge*, and the County of *Aunis*, for the Converſion of the *Proteſtants* in thoſe Parts. His moſt Chriſtian Majeſty had been perſuaded to make uſe of the ſecular Arm in that Enterprize; but M. *Fenelon* was ſo far from giving into ſuch Counſels, that he abſolutely refus'd to undertake the Employment, in caſe it ſhould be ſupported by any military Power. His own Terms accordingly were complied with, and he acquitted himſelf with abundance of Succeſs and Reputation.

This Miſſion being finiſhed, he return'd to *Paris*, and paid his Duty to the King, but came no more to Court for the two following Years. He reſumed his Charge over the new Proſelytes. His

eminent Talents, which it was impoſſible for him to conceal, put him within the reach of the higheſt Preferments; but he nobly neglected the Means to procure them; he never ſtudied to inſinuate himſelf into the good Graces of thoſe who had the Diſtribution of the Benefices; and this was the principal, if not the only Reaſon why his Nomination to the Biſhoprick of *Poitiers*, which was intended for him, was cancell'd, before it was made publick.

In the mean time his Fame increaſed daily, and his elaborate Sermons and other Diſcourſes to the new Converts, met with general Applauſe. He now alſo wrote a Treatiſe on the Paſtoral Miniſtry, which, tho' one of his firſt Productions, was then, and ſtill is univerſally admired.

During the Superiorſhip above-mentioned, he became acquainted with Mr. *Boſſuet*, Biſhop of *Meaux*, a noted Writer on the catholick Side, and a Prelate highly capable of giving M. *Fenelon* proper Inſtructions how to diſcharge the Truſt repoſed in him, with Honour and Succeſs. M. *Fenelon* was intimate with him a long time, and liſten'd to his Advice with all the Modeſty and Attention due to the Years, Character, and Endowments of ſo eſtimable a Friend, who had a peculiar Regard for him, and communicated to him ſeveral important Diſcoveries.

The Marquis *de Fenelon*, his Unele, had procur'd for him, likewiſe, the Acquaintance of ſeveral of the Nobility, and amongſt the reſt, the Duke *de Beauvilliers*, at whoſe Requeſt he wrote his Treatiſe *on the Education of a Daughter*, wherein he gave inconteſtable Proofs of his perfect Skill in the Formation of Youth.

The King being inform'd by the Duke, of Mr. *Fenelon*'s extraordinary Capacity and Merit, determined to make him Preceptor to the Duke of

of *Burgundy*, without the leaſt Application made to him by Mr. *Fenelon* himſelf. Every one approv'd of his Majeſty's Choice; and no body more than his old Friend Monſieur *de Meaux*.

Mr. *Fenelon* was about 38 Years of Age when he firſt entered on this new Employment, in the Month of *Sept.* 1689. There were divers other Perſons of diſtinguiſhed Merit, who were likewiſe pitch'd upon to aſſiſt in ſo important an Education. He was now at Court, and under the immediate Aſpect of his Sovereign; but he was as bad a Courtier as before, and as regardleſs of his own Intereſt. All the Benefice he had was a ſmall Priory, which one of his Uncles the Biſhop of *Sarlet* had reſign'd to him. Having learnt betimes to be contented with a little, to proportion his Expences accordingly, and to live free from that Slavery to which Perſons who are avaritious and ſelf-intereſted, are unavoidably expos'd, he continued for ſix Years together a Favourite of his Prince without receiving or asking any Bounty either for himſelf or any of his Family.†

At laſt, the King conferr'd on him the Abby of St. *Vallery*, and nominated him ſome Months after to the Archbiſhoprick of *Cambray*, which then happened to be vacant. The *Abbe de Fenelon* at firſt modeſtly declin'd the Offer, fearing he ſhould not be able to reconcile the Care of a Dioceſe with the Duties of his Employment. But as

† This Circumſtance reflects as much Diſgrace upon the Prince, as it does Honour upon Mr. *de Fenelon*; unleſs it may be ſaid, the King was loath to confer any Functions upon him during that Time, which he either could not conſcientiouſly diſcharge, or which, if he did, muſt neceſſarily divert him from the more important Duty of his Royal Pupil's Education. It is plain the pious M. *Fenelon* was unwilling to accept Preferments when at laſt they were forced on him, for fear of theſe Conſequences.

as the King told him that his Abſence at Times might and ſhould be diſpenſed with, he ſubmitted to his Majeſty's Pleaſure, upon Condition he might ſpend nine Months of the Year at *Cambray*, and three with the Prince.

When he accepted of this laſt Dignity, he reſigned the Abby of St. *Vallery*, without deſiring that it might be beſtowed on any of his Friends or Relations. The King ſeem'd ſurpriz'd, and preſs'd him to keep it; but he anſwered, that the Revenues of his Archbiſhoprick were more than ſufficient, and that the holding a Plurality of Livings was a Violation of the Canons of the Church. He relinquiſhed likewiſe the Priory at the ſame time, which was preſented him, as has been related, by his Uncle.

There not being room in this Number for finiſhing the Memoirs of this great Prelate, I am obliged to refer the Remainder of them, with ſome Enlargements, to the next Republick.

ARTICLE XII.

State of Learning.

ROME.

I. THEY are printing at the *Vatican*, *Les Annales d'Orient*, by M. *Aſſemanni*.

II. Father *Bremond*, a *Dominican*, is printing at the Preſs of the Apoſtolic Chamber, *The Annals of his Order*; they will be 15 or 16 Volumes in

in *Folio*; the firſt will be finiſhed in a few Months. The ſame Gentleman has furniſhed the Publick, likewiſe, with the *Bullary* of his Order, in ſix Volumes in *Folio*; to which he is about to add a ſeventh, containing a Supplement and general Index.

III. They are alſo printing at the *Vatican* the Works of *Ephrem Syrus*, with M. *Aſſemanni*'s Notes. They will be three Volumes *Greek* and *Latin*, and the ſame in *Latin* and *Syriac*. The firſt and ſecond Tomes of the *Greek* and *Latin*, and the firſt Tome of the *Syriac*, are actually done.

IV. M. *Aſſemanni* has finiſhed the fourth and laſt Tome of his *Bibliotheque Orientale*.

V. The fourth Tome of *Anaſtaſius* the Librarian, with the Notes of Mr. *Blanchini*, is entirely printed. There is a fifth going forward, which will compleat the Works of that Author.

VERONA.

I. THEY are going on here with an Edition of the Works of Cardinal *Sadolet* in one Volume in *Folio*; as likewiſe with an Edition of *Paſtor Fido* in *Quarto*. The Cuts of this laſt are very beautiful, though they are inferior to thoſe done at *Rome* for an Edition of the ſame Book, which is printing in that City: The Deſigns of thoſe are different from ours.

II. Father *de Ebora*, Miniſter of the King of *Portugal*, is printing *Waldingii Annales Ordinis Fratrum Minorum*, with a Continuation, and the Additions of Father *Luequeſini* and others; the Work will conſiſt of eighteen Volumes in *Folio*; ſix for the Annals; the remaining twelve will contain the Portraits of 2500 great Men of the Order. The firſt fourteen Volumes are actually done.

III. The

III. The fifth Tome (in two Parts) of the Works of *Sigonius*, with the Abbe *Maffir*'s Notes, are juſt ready for the Preſs.

FLORENCE.

I. DR. *Franciſco Gori*'s *Le Muſæo Etruſco* is printing here; the Author does it by Subſcription. The Plates, which are already finiſhed, are very fine; which is a very deſirable Circumſtance in a Performance of this Nature.

II. The fourth Tome *Du Vocabulario della Cruſca* is publiſhed, and the fifth is in the Preſs. The third Tome of the *Muſæum Florentinum*, and the third Tome of *Euſtathius*'s Comment on *Homer*, are alſo publiſhed. The fourth Tome of this laſt is in the Preſs. There will be a fifth to finiſh the Work.

III. There is an Impreſſion of the Works of *Meurſius*, with Notes, going foward at the *Ducal* Printing-Houſe: They will make five or ſix Volumes in *Folio*.

LUCCA.

WE are printing here *L'Hiſtoire Diplomatique de Maltha*, in *Italian*; there will be ſeveral Volumes of it in *Folio:* The firſt Tome is now publiſhed.